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R.A.M.C.

TRAINING PAMPHLET No. 2

1950

**ARMY MEDICAL SERVICES
IN THE FIELD**

By Command of the Army Council,

R. W. Summer.

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THE WAR OFFICE
28th July 1950

AMENDMENTS

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PREFACE

The Royal Army Medical Corps Training Manual, 1935, is now replaced by the following Training Pamphlets :—

R.A.M.C. Training Pamphlet No. 1 (1950)—Drills and Exercises.



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R.A.M.C.

TRAINING PAMPHLET No. 2

1950

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IN THE FIELD**

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R.A.M.C. TRAINING PAMPHLET No. 2 (1950)

ARMY MEDICAL SERVICES IN THE FIELD

(NOTE: For ease of reference the approximate equivalent terminology in the U.S. Army is shown in *italics* in this Publication opposite the British Medical Unit where it is first mentioned.)

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ABBREVIATIONS

A.	Adjutant-General's Branch.
A. and D. (book)	Admission and Discharge (book).
A.Q.	Assistant Adjutant and Quarter-Master-General's Branch.
A.A. and Q.M.G.	Assistant Adjutant and Quarter-Master-General.
A.B.	Army Book.
A.C.C.	Army Catering Corps.
A.D.A.H.	Assistant Director of Army Health.
A.D.A.N.S.	Assistant Director Army Nursing Service.
A.D.D.S.	Assistant Director Dental Services.
A.D.M.S.	Assistant Director of Medical Services.
A.D.P.	Assistant Director of Pathology.
A.D.S.	Advanced Dressing Station.
A.F.	Army Form.
A.G.	Adjutant-General.
A.M.A.	Army Maintenance Area.
A.P.M.	Assistant Provost-Marshal.
A.T.S.	Anti-tetanic serum.
B.D.S.	Beach Dressing Station.
B.G.S.	Brigadier, General Staff.
B.M.A.	Beach Maintenance Area.
B.M.U.	Beach Medical Unit.
B.T.U.	Base Transfusion Unit.
C.A.E.S.	Casualty Air Evacuation Squadron.
C.C.P.	Casualty Collecting Post.
C.C.S.	Casualty Clearing Station.
C.D.P.	Casualty disembarkation point.
C.E.P.	Casualty embarkation point.
C.G.S.	Chief of the General Staff.
C. in C.	Commander-in-Chief.
C.M.A.	Corps Maintenance Area.
C.O.	Commanding Officer.
C. of S.	Chief of Staff.
C.R.E.	Commander Royal Engineers.
D.A.D.A.H.	Deputy Assistant Director of Army Health.
D.A.D.M.S.	Deputy Assistant Director of Medical Services.
D.A.D.S.	Director Army Dental Services.
D.A.G.	Deputy Adjutant-General.
D.A.P.M.	Deputy Assistant Provost-Marshal.
D.A.N.S.	Director Army Nursing Service.
D.A. and Q.M.G.	Deputy Adjutant and Quarter-Master-General.

ABBREVIATIONS—*continued*

D.D.D.S.	Deputy Director Dental Services.
D.D.A.H.	Deputy Director of Army Health.
D.D.A.N.S.	Deputy Director Army Nursing Service.
D.D.M.S.	Deputy Director of Medical Services.
D.D.P.	Deputy Director of Pathology.
D.D.S.T.	Deputy Director of Supplies and Transport.
D.G.A.M.S.	Director-General, Army Medical Services.
D.M.S.	Director of Medical Services.
D.R.	Despatch Rider.
D.Q.M.G.	Deputy Quarter-Master-General.
D.Z.	Dropping Zone.
E.M.O.	Embarkation Medical Officer.
Fd. Amb.	Field Ambulance.
F.D.C.	Field Dental Centre.
F.D.S.	Field Dressing Station.
Fd. Hyg. Coy.	Field Hygiene Company.
Fd. Hyg. Sec.	Field Hygiene Section.
F.M. (card)	Field Medical (card).
Fd. Med. Coy.	Field Medical Company.
F.S.	Field Service.
F.S.T.	Field Surgical Team.
F.T.T.	Field Transfusion Team.
G.	General Staff Branch.
Gen. Hosp.	General Hospital.
G.H.Q.	General Headquarters.
G.O.C. (in C.)	General Officer Commanding (in Chief).
G.S.O. 1	General Staff Officer 1st Grade.
H.Q.	Headquarters.
L.C.A.	Landing Craft Assault.
L.C.I.	Landing Craft Infantry.
L.C.P.	Landing Craft Personnel.
L.C.T.	Landing Craft Tank.
L. of C.	Line or Lines of Communication.
L.S.I.	Landing Ship Infantry.
L.S.T.	Landing Ship Tank.
L.V.T.	Landing Vehicle Tracked.
L.V.W.	Landing Vehicle Wheeled.
M.A.C.	Motor Ambulance Company.
M.A.I.	Medical Administrative Instructions.
M.F.T.U.	Medical Forward Treatment Unit.

ABBREVIATIONS—*continued*

m.i.h.	miles in the hour.
M.O.	Medical Officer.
M.S.	Military Secretary.
M.T.	Mechanical Transport.
N.C.O.	Non-commissioned Officer.
N.O.B.U.	Naval Officer Build Up.
O.C.	Officer Commanding.
O. i/c	Officer-in-Charge.
O.R.	Other Rank.
O.2E.	Officer-in-Charge 2nd Echelon G.H.Q.
Q.	Quarter-Master-General's Branch.
Q.A.R.A.N.C.	Queen Alexandra's Royal Army Nursing Corps.
Q.M.G.	Quarter-Master-General.
R.A.D.C.	Royal Army Dental Corps.
R.A.F.	Royal Air Force.
R.A.M.C.	Royal Army Medical Corps.
R.A.O.C.	Royal Army Ordnance Corps.
R.A.P.	Regimental Aid Post.
R.A.S.C.	Royal Army Service Corps.
R.E.	Royal Engineers.
R.E.M.E.	Royal Electrical and Mechanical Engineers.
R.M.O.	Regimental Medical Officer.
R.N.	Royal Navy.
R.T.	Radio-Telephony.
S.M.O.	Senior Medical Officer.
T.C.V.	Troop carrying vehicle.
T.E.W.T.	Tactical exercise without troops.
v.t.m.	vehicles to the mile.
W.O.	Warrant Officer.
W.R.A.C.	Women's Royal Army Corps.
W.T.	Wireless Telegraphy.

ARMY MEDICAL SERVICES IN THE FIELD

CHAPTER 1

TRAINING IN GENERAL

1. This pamphlet deals with the organization and administration of the army medical services in the field and with tactical military training for personnel of these services. It is not concerned with the professional teaching of officers or with the technical instruction of other ranks, both of which highly important aspects of training must proceed concurrently with tactical military training. It has only a limited application to personnel of the dental and nursing corps, whose duties are almost wholly professional or technical.

2. The Army Medical Services consist of :—

The Royal Army Medical Corps (R.A.M.C.).

The Royal Army Dental Corps (R.A.D.C.).

Queen Alexandra's Royal Army Nursing Corps
(Q.A.R.A.N.C.).

They are maintained to carry out the following duties :—

- (a) The promotion of health and the prevention of disease.
- (b) The care and treatment of the sick and wounded.
- (c) The collection and evacuation of casualties in the field.
- (d) The supply and replenishment of medical equipment.

3. In order to perform their duties efficiently officers must not only keep their professional knowledge thoroughly up to date, but must also possess a general knowledge of the organization and administration of the Army as a whole in peace and war, and a detailed knowledge of the working of the medical services.

4. The promotion of health and the prevention of disease are dealt with in the Army Manual of Hygiene and Sanitation. Every opportunity must be taken, especially at camps, to study the practical application of the instructions given in that manual.

5. In the field, R.A.M.C. officers are responsible for the immediate treatment of the sick and wounded, their collection and transportation from the fighting area, their care, treatment and discipline while in medical units or when under medical supervision, the compilation of statistics and records of general and professional interest regarding them, and the replenishment of medical equipment. These duties must be carried out in conformity with the general scheme of administration of the Army.

6. For the efficient performance of their duties in the field R.A.M.C. officers must have some knowledge of the general principles on which military operations are conducted.

7. Courses of instruction are held at the Field Training School, Royal Army Medical Corps (para. 16), in order to assist officers of the R.A.M.C. to acquire a working knowledge of army organization and administration and a detailed knowledge of the medical services in the field.

8. Administrative medical officers are responsible for the progressive instruction of all officers serving under them in the organization and administration of the medical services. Commanders of medical units are responsible for the training of their unit medical officers in the administration and interior economy of their unit.

9. Individual training is effected by means of tactical exercises without troops (T.E.W.T.), lectures, courses and demonstrations.

10. When staff exercises are held for the study of tactical problems, officers of the R.A.M.C. should, whenever possible, attend in order to keep in touch with new developments and their bearing on the medical services in the field.

11. When medical exercises are held for the tactical instruction of officers of the medical services, the D.D.M.S. or A.D.M.S. concerned should obtain the assistance of the general staff in drawing up a tactical scheme, on which to base the exercise.

The senior medical officer on the directing staff should detail the medical officers to the appointments laid down for the medical services in war. These officers should then be ordered to write an appreciation, together with the orders and instructions which they would issue in war. When completed their work should be handed in to the directing staff for discussion and criticism.

12. At centres where a number of officers of the R.A.M.C. can be assembled, the D.D.M.S. or A.D.M.S. will arrange to hold lectures and discussions on army medical organization and administration in the field. A medical officer should be selected to deliver a paper, preferably based on his own observations, and every officer should be called on to take part in the ensuing discussion. This fosters interest in the subject under discussion and assists in training officers to express their ideas clearly.

13. Demonstrations with the aid of models form a valuable means of instruction, especially in regard to the location of the various medical installations in the forward areas, the road space and time required for the movement of units and the evacuation of casualties.

Schemes worked out on paper are useful in making officers familiar with establishments, *e.g.*, strengths of units and formations, available transport, accommodation in medical units.

14. Basic military training for all ranks of the medical services is carried out at the respective Depots and Training Establishments of the R.A.M.C., R.A.D.C. and Q.A.R.A.N.C.

15. Courses of instruction are held at the Royal Army Medical College mainly in professional subjects, at the Army School of Health in the principles of hygiene and the prevention of disease, and at the Field Training School, Royal Army Medical Corps.

Field Training School

16. The courses at the Field Training School R.A.M.C. include :—

- (a) Cloth model exercises and demonstrations.
- (b) Exercises in packing and loading field equipment, administration of first aid, collection, carriage, classification and documentation of casualties, and reconnaissance, siting, signposting and deployment of field medical units.
- (c) Instructions in map reading and radio-telephony, the writing of appreciations, orders, instructions and messages, the system of evacuation of casualties from front to base, medical organization and administration in the field, and the duties of medical personnel and of field medical units in various types of warfare.

17. The courses at the Field Training School R.A.M.C. are held for :—

- (a) All officers of the R.A.M.C. on first entry.
- (b) All regular officers of the R.A.M.C. after approximately seven years' service.
- (c) Regular officers of the R.A.M.C. selected for staff appointments in the Territorial Army or for the Staff College course.
- (d) Selected officers of the medical services of the Territorial Army.
- (e) Selected officers of the R.A.D.C. and Q.A.R.A.N.C.
- (f) Selected warrant officers and senior non-commissioned officers of the medical services, regular and territorial.

In addition, the Director-General of the Army Medical Services conducts an annual exercise at the School for senior officers of the medical services.

18. The N.C.Os. and men of regimental medical establishments will be given practical instruction in their duties by the officer in

medical charge of the unit. The regimental stretcher-bearers will be practised in rendering first aid and carrying casualties on stretchers and in manning regimental aid posts.

19. Water duty and sanitary personnel of regimental units are trained at the Army School of Health ; the officer in medical charge of a unit should arrange with the O.C. unit that they are employed on these duties whenever possible, and that they are fully acquainted with them especially during the periods of field training. Suitable replacements must also be trained.

20. Collective field training of the R.A.M.C. is carried out during brigade and divisional training and at manoeuvres.

21. At manoeuvres and on field days, the medical services will be represented as completely as circumstances permit ; every advantage should be taken of exercising all ranks of the medical services in field medical and hygiene duties, and in examining, packing and loading the equipment.

CHAPTER 2

ORGANIZATION OF THE MEDICAL SERVICES IN THE FIELD

22. The medical organization for dealing with casualties in the field comprises the following :—

(a) Regimental medical establishments. (*Regimental medical companies.*)

(b) R.A.M.C. units, viz. :—

Field ambulances. (*Field medical companies.*)

Field dressing stations.

Casualty clearing stations. (*Evacuation hospitals (semi mobile.)*)

Field hygiene sections.

Field hygiene companies.

Field medical companies.

Ambulance trains. (*Hospital trains.*)

General hospitals. (*General hospitals.*)

Convalescent training depots. (*Convalescent camps.*)

Hospital ships. (*Hospital ships.*)

Advance depots of medical stores. (*Supply detachments.*)

Base depots of medical stores. (*General depot medical sections of medical branch depots.*)

Base transfusion units. (*Blood transfusion detachments.*)

Medical forward treatment units—only in tropical or sub-tropical countries.

Malaria control companies—only in malarious areas. (*Malaria control detachments.*)

Beach medical units—only in opposed landings. (*Medical battalions engineer special brigade.*)

All the above units are self-contained.

(c) R.A.M.C. and R.A.D.C. Specialist Teams and Laboratories, etc., *viz.* :—

Field surgical teams. (*Surgical detachments.*)
 Field transfusion teams. (*Shock detachments.*)
 Mobile ophthalmic teams.
 Mobile ear, nose and throat teams.
 Mobile neuro-surgical teams. (*Nerve surgical detachments.*)
 Maxillo-facial surgical teams. (*Maxillo facial detachments.*)
 Chest surgery teams. (*Thoracic surgical detachments.*)
 Special treatment teams.
 Burns teams.
 Mobile dental teams.
 Mobile hygiene laboratories.
 Mobile bacteriological laboratories.
 Central pathological laboratory.
 Post operating detachments.
 Field dental centres. (*Dental operating detachments.*)
 Field dental laboratories. (*Dental prosthetic detachments (fixed).*)
 Base malaria field laboratories } only in malarious areas.
 Mobile malaria field laboratories } (*Malaria survey teams.*)

These teams, etc., are attached to a parent unit for maintenance and administration.

(d) R.A.S.C. units, *viz.* :—

Motor ambulance companies. (*Medical ambulance companies (separate).*)

23. The personnel and transport authorized for the units, etc., shown in the preceding paragraph are shown in War Establishments ; their equipment is shown in War Equipment Tables (A.F. G.1098 series) and in Medical Mobilization Scales (A.F. I.1248 series).

24. The standard allotment of medical units, etc., to formations is shown in Appendix 1. It should be noted that there is no standard composition for certain Army and G.H.Q. troops, since their allotment will be affected by the conditions prevailing in the particular theatre of operations.

25. Each division and corps has a basic allotment of field medical units ; these are divisional or corps troops. Each army is allotted a number of field medical units and teams, some of which are sub-allotted to corps, *e.g.*, casualty clearing stations. All other units and teams of the medical services are allotted to formations in accordance with the requirements of the situation, and the actual distribution of such units is made by the C. in C., on the recommendation of the D.M.S. They are included either in G.H.Q., L. of C., or army troops (*see Appendix 1*).

26. All medical units, teams, etc., in the field are under the administrative control of the administrative medical officer of the formation or area in which they are serving.

27. Motor ambulance companies, not being medical units, are administered by the Royal Army Service Corps, but are controlled operationally by the D.M.S., or his representative in formations and areas.

CHAPTER 3

ADMINISTRATION OF THE MEDICAL SERVICES IN THE FIELD

28. For the proper understanding of medical administration in the field, it is necessary for all officers of the medical services to have a general knowledge of how the army in the field is administered as a whole.

The broad principles are shown in the diagrammatic scheme, Fig. 1.

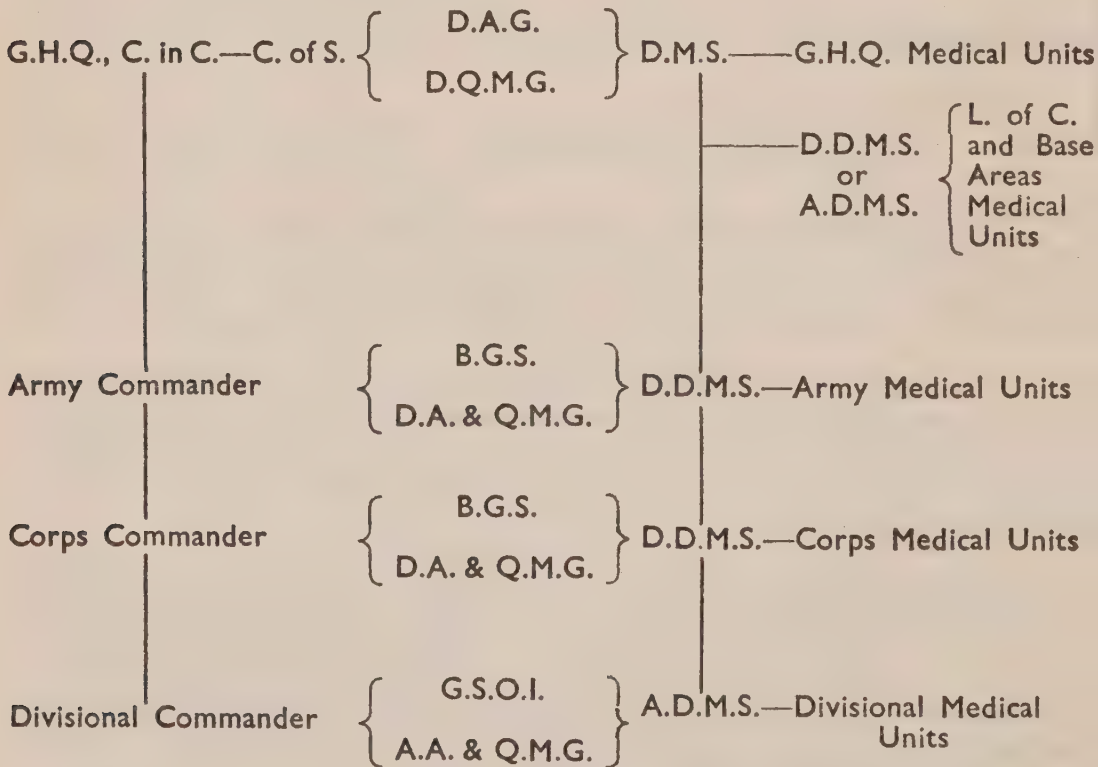


FIG. 1.—ADMINISTRATION IN THE FIELD AND CHANNELS OF COMMUNICATION BETWEEN STAFFS OF FORMATIONS.

29. Under the commander, the staff is organized in three main branches, *viz.* :—

The general staff branch (G).

The adjutant-general's branch (A).

The quartermaster-general's branch (Q).

G branch deals with the training and employment of fighting troops, with military intelligence and with all matters connected with the actual execution of military operations. " A " branch deals with personnel and is responsible for the medical and health services, casualty records, graves registration, discipline and welfare of the troops. Q branch deals with the supply of material (except medical equipment), transport, movements and accommodation.

30. Maintenance of men and material is carried out through the services under the supervision of the branches of the staffs as given below :—

(a) Under the A.G.'s branch :—

Chaplain's service.

Medical service.

Graves service.

Pay service.

Provost service.

Legal service.

Women's service.

(b) Under the Q.M.G.'s branch :—

Supply and transport service.

Ordnance service.

Electrical and mechanical engineering service.

Transportation service.

Works service.

Engineer stores service.

Labour service.

Remount and veterinary service.

Hiring service.

Postal service.

Canteen service.

31. The directors of services receive their instructions from the appropriate branch of the staff. To enable the services to function efficiently, it is incumbent on the staff to provide the services with timely information regarding the enemy, the theatre of operations, future plans and movements and probable requirements of the troops.

32. The duties of the A.G.'s branch, under which the medical services work, include the collection and compilation of detailed

statistical information which can only be effectively carried out at a fixed centre. The A.G.'s branch is therefore organized in two main groups :—

- (a) D.A.G.'s staff at G.H.Q. and with formations in the field.
- (b) D.A.G.'s office at the base (2nd Echelon).

33. 2nd echelon is organized to deal with records, casualties, effects, reinforcements and statistics. In the execution of his work the officer in charge 2nd echelon (O2E) communicates directly with officers commanding units of both fighting troops and services, who supply him with the information he requires. Every medical unit renders to 2nd echelon a daily return of all admissions, discharges, transfers and deaths occurring in the unit. In addition medical units telegraph to 2nd echelon particulars of deaths on occurrence and particulars of patients placed on or removed from the seriously or dangerously ill list. (See Chapter 9—Documentation.)

34. The administrative medical officer of a formation is the adviser of the commander on all matters affecting the health and fitness of the troops. He is responsible to " A " branch of the staff for the organization, disposition and control of the medical services. " A " branch co-ordinate all matters of general medical policy in consultation with other branches of the staff as may be necessary.

35. In implementing the policy approved by " A " branch, the administrative medical officer deals direct with G and Q branches of the staff and with the services, on detailed matters of provision, movement and accommodation of medical units.

To enable the administrative medical officer to carry out his duties efficiently, he must be kept fully informed of future plans by the staff.

36. The ultimate aim of the medical services is the preservation of man-power. Man-power is lost from two chief causes :—

Disease.

Enemy action.

It is accordingly the responsibility of the medical services :—

- (a) To advise commanders on measures calculated to maintain a high standard of positive health and to prevent disease in the troops under their command ;
- (b) To collect, evacuate and treat sick and wounded with a view to their speedy return to duty.

37. The medical services deal with the feeding, pay, clothing, discipline and disposal of all sick and wounded from the time they come under medical care until they are discharged to duty, or invalided from the service.

Director of Medical Services (*Theater Surgeon*)

38. The head of the medical services in the field is the Director of Medical Services (D.M.S.). He is attached to the adjutant-general's branch at G.H.Q. He directs the medical services as a whole, and exercises command over such medical units as are retained under G.H.Q. control.

The D.M.S. is represented by medical staff officers at headquarters of armies, corps, divisions, L. of C. and base areas. These representatives in addition to their administrative duties, exercise command over the medical units in their respective formations and areas.

39. The D.M.S. is the adviser of the C. in C. on all medical and health matters. Similarly, his representatives at headquarters of subordinate formations are the advisers of their commanders.

40. The D.M.S. and his representatives deal directly with the quartermaster-general's branch of the staff on questions in connection with the siting and construction of hospitals, ambulance trains and hospital ships, the movement of medical units and the provision of diets for patients.

41. The D.M.S. and his representatives are responsible for the administration of the medical services and, subject to the policy formulated by the staff, for the provision of the requirements of the troops in so far as the medical service is concerned. They should maintain close personal touch with the staff and with commanders; this liaison is most important.

42. The D.M.S. and his representatives at headquarters of formations have direct access to commanders and principal staff officers.

43. The D.M.S. and his representatives at formations should frequently visit the medical units within their area to assure themselves that the medical services are carrying out their role satisfactorily; such visits afford them an opportunity of estimating the capabilities of their officers.

44. The D.M.S. communicates directly with his representatives at headquarters of formations and areas, and issues instructions to them on matters of professional and technical detail connected with the medical service. His representatives keep their commanders informed of all important instructions on professional and technical matters received from the D.M.S.

45. The D.M.S. is responsible for co-ordinating the work of the professional services under his control, *viz.*: the clinical, health, pathology, dental and nursing services. He has a staff of administrative officers to assist him, as well as certain consultants and advisers; these are detailed in War Establishments.

46. The D.M.S. as the expert adviser of the C. in C. should foresee and bring to his notice all matters which may affect the health and so the fighting efficiency of the forces. A high standard of health assists in maintaining the fighting strength of units, contributes to their efficiency by maintaining morale and reduces the strain enforced on the service of evacuation.

47. The D.M.S. arranges through the staff that medical reinforcements and medical supplies are provided when required. On matters of technical detail not involving policy, he is authorized to correspond direct with the D.G.A.M.S., War Office. Copies of important communications will be sent to the principal staff officer concerned.

48. The D.M.S. ensures that adequate arrangements are put into effect for the evacuation, treatment and accommodation of casualties within the theatre of operations and if necessary for their evacuation outside the theatre.

49. The numbers evacuated, and the nature of their disabilities, require constant supervision to ensure that transport is not needlessly taken up for this service and that the forces are not unnecessarily depleted. Whenever possible, cases of minor illness should be retained and treated in forward medical units.

50. The D.M.S. arranges for the medical inspection and categorization of men evacuated from the forward areas on account of unfitness and of those in convalescent training depots before being returned to duty. A standing medical board may be appointed to deal with these matters, as also with recommendations for periods of sick leave or furlough.

Deputy Director of Medical Services—Lines of Communication

51. The D.D.M.S. L. of C. is the representative of the D.M.S. on the L. of C. and is attached to the adjutant-general's branch of the staff at headquarters L. of C. He exercises command over the general hospitals and other medical units and teams allotted to the L. of C. He is assisted by a staff which is shown in Establishments. The L. of C. may be divided into base and other areas or sub-areas on the staff of which an A.D.M.S. is included. The D.D.M.S. L. of C. is responsible for all medical arrangements within the L. of C.

Deputy Director of Medical Services—Army (*Army Surgeon*)

52. The D.D.M.S. of an army is the representative of the D.M.S. and is attached to the adjutant-general's branch of the staff at army headquarters. His duties in the army are in general similar to those

of the D.M.S. at G.H.Q. The D.M.S. of an army is assisted by a staff which is shown in Establishments.

The D.D.M.S. army commands the army medical units and any other medical units that the D.M.S. may have placed under his orders. He will allot to corps the required number of medical units and teams. Once allotted, changes in this allocation should be made as seldom as possible and only for some imperative reason.

The D.D.M.S. army is responsible for the medical arrangements within the army and for the evacuation of casualties from corps medical installations.

Deputy Director of Medical Services—Corps (*Corps Surgeon*)

53. The D.D.M.S. corps is the representative of the D.M.S. on the headquarters of a corps and is attached to the adjutant-general's branch of the staff. The D.D.M.S. corps is assisted by an assistant director of army health (A.D.A.H.) and a deputy assistant director of medical services (D.A.D.M.S.) and certain other officers shown in Establishments. The D.D.M.S. corps commands the corps field dressing stations, and the field hygiene section in the corps and any medical units which are placed under his control by the D.M.S. or D.D.M.S. army; these include casualty clearing stations, field surgical teams and field transfusion teams in ratio to the number of divisions in the corps.

54. The D.D.M.S. corps is responsible for all medical arrangements within the corps and for the evacuation of casualties from the field ambulance and field dressing stations of divisions. For this purpose a motor ambulance company R.A.S.C. is allotted to the corps, over which the D.D.M.S. exercises operational control.

55. The D.D.M.S. corps co-ordinates the medical work in his area. Thus he organizes the siting of the casualty clearing stations and allots the field surgical and transfusion teams to C.C.Ss. Should circumstances demand it, he will arrange to open an advanced surgical centre (*see* para. 192); when possible he will form a corps medical centre (*see* para. 197).

56. The D.D.M.S. corps should hold periodical conferences with the A.Ds.M.S. in his corps and always when active operations are being planned. A free discussion of plans and requirements is preferable and speedier than attempts to settle difficulties by correspondence.

57. The D.D.M.S. should frequently visit all parts of the corps area, to satisfy himself that a satisfactory standard of health is being maintained and that the sick and wounded in medical units are being properly cared for, with a due observance of economy in the use of equipment and ambulance transport.

Should a division show a high sick rate, the D.D.M.S. should inquire into the cause and take any action he may consider necessary through the adjutant-general's branch of the staff.

The D.D.M.S. should ensure that medical equipment is used in the most economical manner and check any excessive expenditure; he will maintain an adequate reserve of medical equipment, blankets and stretchers.

Assistant Director of Medical Services—Division (*Divisional Surgeon*)

58. The A.D.M.S. is the representative of the D.M.S. and is attached to the adjutant-general's branch of the staff at divisional headquarters. He is the adviser of the divisional commander on all medical matters and on all matters of health affecting the division. He is responsible for all medical arrangements within the division.

The A.D.M.S. administers the medical services of the division and commands its medical units. He is assisted by a deputy assistant director of medical services (D.A.D.M.S.) and by a deputy assistant director of army health (D.A.D.A.H.).

59. The A.D.M.S. should keep in close touch with the divisional staff, particularly the general staff, in order to obtain early information of expected operations and thus be prepared to deal with an influx of casualties. He should keep himself intimately acquainted with his area and with the capabilities of his medical units and officers, and know to what extent he can rely on them when pressure comes, and also what accommodation and transport he can obtain in an emergency. He must be able and willing to take responsibility and to make quick decisions without reference to higher authority.

60. The A.D.M.S. should frequently visit all units in the division to satisfy himself that the medical service is in every way satisfactory. He should discuss with commanding officers any medical or health matters which concern their units. A personal interview saves time and correspondence and obviates possible misunderstanding.

61. The A.D.M.S. is responsible for the training of the R.A.M.C. officers and other ranks in his division. It is his duty to ensure that adequate instruction is given and that a high standard of training is maintained.

62. The A.D.M.S. should ensure that adequate proficiency in first aid is maintained in every unit in the division; this is of particular importance in armoured and airborne formations; he will arrange for the necessary instruction to be given.

63. He should periodically visit the R.A.P. of each unit of the division with the officer in medical charge of the unit, and where possible with the officer commanding the unit and the field ambulance commander concerned. He should satisfy himself that the medical officer understands his duties and is carrying them out satisfactorily and that the C.O. and regimental officers are taking steps to ensure that the recommendations of the medical officer are receiving adequate attention. Points which require noting are :—

- (a) The average number reporting sick daily and their ailments. A large number of imaginary diseases may indicate loss of morale in the unit and should be brought to the C.O.'s notice.
- (b) That all men in the unit are in their correct category of medical fitness and that all outstanding re-gradings and medical boards are being completed without delay.
- (c) That the vaccination and inoculation state of the unit are satisfactory.
- (d) The state of the medical equipment of the unit. A useful procedure is to have it checked periodically by a quartermaster detailed from a medical unit.
- (e) The general sanitary conditions of the area.
- (f) Special precautions against local diseases.

64. Should the A.D.M.S. find any unsatisfactory conditions he will draw the attention of the C.O. of the unit to the state of affairs, and point out to the officer in medical charge the steps that should be taken to remedy the defects.

65. When visiting medical units, which he should do frequently, the A.D.M.S. should see that the accommodation for, and treatment of, sick and wounded are as good in every way as local conditions permit, and that the sick and wounded are not kept waiting longer than is unavoidable before receiving food and treatment, or before being evacuated. He should see that due care is exercised to prevent waste of equipment, that indents for supplies are supervised and that a sufficient reserve of medical stores, blankets and stretchers are available for use at the shortest notice.

66. The A.D.M.S. will maintain close touch with the Os.C. of the field ambulances and field dressing station; before active operations he will hold a conference which they will attend, at which the divisional medical plan will be fully explained.

Field Ambulance Commander. (S.M.O. Brigade.) (*Regimental Surgeon*)

67. A field ambulance is normally placed in support of an infantry or armoured brigade. The officer commanding, in addition to

performing the ordinary duties of an officer commanding a medical unit, will undertake the duties of Senior Medical Officer (S.M.O.) to that brigade and the area it occupies. In this capacity he is the adviser of the brigade commander on all medical matters and will relieve the A.D.M.S. with regard to that brigade area of as many as possible of the routine duties referred to in paragraphs 60 to 65.

Movement of medical units and personnel

68. Moves of medical units or teams which are self-contained with regard to transport are ordered by medical administrative officers with the concurrence of the staff, a route being obtained if necessary.

69. Moves of medical units which are not self-contained with regard to transport are not normally ordered by the medical branch. The administrative medical officer concerned advises as to the time and the new location; the orders for the move are issued by the staff who provide the necessary transport.

70. Moves of medical personnel within a formation are ordered by the administrative medical officer concerned with the concurrence of "A" branch, except in the case of administrative medical officers, when the move is ordered by "A" or M.S. branch.

71. Before moving a regimental medical officer, the A.D.M.S. should inform the unit commander of his intention. If, however, an R.M.O. becomes a casualty in battle he should be replaced immediately by an officer detailed by the O.C. of the field ambulance in support; if the A.D.M.S. approves the posting he will confirm it subsequently.

72. Occasions may arise when the A.D.M.S. will find it expedient to form a pool of regimental medical officers of those units (other than infantry) which are dispersed in battle, *e.g.*, anti-tank and anti-aircraft artillery.

CHAPTER 4

MEDICAL APPRECIATIONS : MEDICAL PLANNING : MEDICAL OPERATION INSTRUCTIONS : MEDICAL ADMINISTRATIVE INSTRUCTIONS

Medical appreciations

73. In the planning state of a campaign, a medical appreciation is usually required :—

- (a) to assist the commander in formulating his plan of action ;
- (b) to determine medical policy, particularly with regard to evacuation.

74. An appreciation is a review of the situation based on all available information, culminating in a statement of the measures recommended to meet it.

75. A medical appreciation should follow the logical sequence of headings adopted in a military appreciation, suitably modified, *viz.* :—

(a) *The aim.*—From the point of view of the medical services, the aim will always be the preservation of man-power in the field by :—

- (i) the promotion of health and the prevention of disease ;
- (ii) the efficient collection, rapid evacuation and skilled professional treatment of casualties, with a view to their speedy return to duty.

(b) *Factors.*—From the medical viewpoint these may be grouped into three main headings :—

- (i) The nature of the operation, *viz.* : whether an assault landing, or an advance from a consolidated base, the relative strengths of the sea, land and air forces engaged, and whether the fighting is to be open or close. On these factors will depend the number of wounded, on which point the general staff will be able to furnish an estimate.
- (ii) The climate of the country, whether temperate, tropical or sub-tropical, with the liability to endemic and epidemic disease, *e.g.*, malaria and dysentery. On this factor will depend the number of sick. It will also determine the nature of the appropriate measures for the prevention of disease, the scale of rations, and the type of clothing. The Directorate of Army Health will be able to furnish advice and information on these points.
- (iii) The topography of the area, whether developed, desert, jungle or arctic, mountain or plain. On this will depend the local resources, the water supply, the accommodation for hospitals and the facilities for evacuation, such as roads, railways, waterways and airfields. The quartermaster-general's branch of the staff will be able to furnish information on these points, and as the maintenance route is necessarily the line of evacuation for casualties, they should be consulted regarding the means of transport to be employed, the position of ambulance railheads and the most suitable areas for the hospital base and advanced base.

Valuable information on the points referred to in (b) (ii) and (iii) is obtainable from a study of intelligence summaries.

(c) *Courses open*.—In the light of the above factors and deductions therefrom, consideration is now given to the methods for dealing with the medical problems of the campaign. The following will have to be determined :—

- (i) The percentage of hospital beds required based on the strength of the force, and the proportion of these to be maintained in the theatre of operations and outside it.
 - (ii) Whether the medical units shown in the standard order of battle are adequate, or whether any modification is necessary such as, for example, the provision of medical forward treatment units in tropical areas so as to save transport and prevent undue depletion of the forward troops.
 - (iii) Whether the standard methods of evacuation are sufficient, or whether any modification is required in the way of air, land or water transport, including amphibians.
 - (iv) Whether the standard method for the supply of medical equipment is adequate.
- (d) *The Plan*.—The medical plan should be stated in a definite, simple and practical manner and should consist of :—
- (i) recommendations for the maintenance of health and prevention of disease particular to the campaign ;
 - (ii) a detailed scheme for the collection, evacuation and distribution of sick and wounded.

76. An appreciation should be clear and concise. If it is necessary to include lengthy considerations, calculations, and details for the information of the commander and his staff, they should be given in appendices, reference only being made to them in the appreciation proper.

77. During active operations it will seldom, if ever, be necessary to prepare a written medical appreciation. But in dealing with any problem, administrative medical officers should cultivate the habit of mentally approaching it in a logical sequence, lest any point be overlooked.

Medical planning

78. Throughout the period of planning, the D.M.S. will keep in constant touch with the staff. He attends the commander's and the staff conferences ; in matters of detail he deals directly with the other Services. He maintains liaison with the principal medical officers of the Royal Navy and of the Royal Air Force. Before submitting his final plan, he will obtain from the staff decisions on any question of policy which he himself is not competent to determine.

79. The type and number of field medical units required for divisions, corps and armies are laid down in the Standard Allotment of Medical Units (*see* Appendix 1). In the case of G.H.Q. troops, there is no fixed allotment of medical units since the requirements vary in each campaign. Consequently the D.M.S. will calculate his medical requirements of these units as a result of his appreciation of each projected operation, and will obtain staff approval for their inclusion in the order of battle.

80. It is particularly important to determine the hospital requirements. These are calculated in terms of beds in general hospitals, and not in terms of medical units. Beds included in forward medical units (*i.e.*, units other than general hospitals) are not included, since these units are not static and evacuate the majority of their patients to general hospitals. The number of beds in general hospitals to be provided for the force is expressed as a percentage of the total strength of the force, and is referred to as hospital bed cover.

81. In past campaigns, the percentage of hospital bed cover provided was subject to wide fluctuation, depending on the circumstances of the individual campaign :—

(a) In World War I, the average figures were approximately :—

France and Flanders	...	...	4 per cent.
Egypt and Palestine	...	...	10 „
Macedonia	...	...	14 „
East Africa	...	...	25 „

In addition, it is estimated that of the beds provided in the United Kingdom, a number approximating to 8 per cent. of the strength of troops in France and Flanders were set aside for casualties from that theatre.

(b) In World War II, the average figures were approximately :—

N.W. Europe	...	...	4 per cent.
North Africa	...	...	6 „
Middle East	...	...	8 „
Far East	...	...	10 „

In addition, it is estimated that of the beds provided in the United Kingdom in military and emergency medical services hospitals, a number approximating to 3 per cent. of the strength of troops in N.W. Europe were set aside for casualties from that theatre. Owing to the extensive use of air evacuation to the United Kingdom the number of beds actually required in N.W. Europe never exceeded 3 per cent.

82. The figures given in the preceding paragraph indicate a remarkable reduction in the hospital bed cover required in World War II,

compared with World War I. This reduction can be ascribed to three factors :—

- (a) advances in preventive medicine leading to a lessened rate of hospital admission for sickness ;
- (b) changes in strategy, leading to a lessened rate of battle casualties ;
- (c) advances in the treatment of both sick and wounded, leading to a lessened stay in hospital.

83. In illustration of the above, the following statistical information giving the mean monthly admission rate per 1,000 strength in N.W. Europe in both wars is relevant :—

	1914-1918	1944-1945
(a) Non-battle casualties ...	53·9	23·7
(b) Battle casualties ...	30·4	14·5

- (c) Although it is not possible to provide an accurate comparison between the average stay in hospital in the two wars, the reduction has been substantial.

84. In order to calculate the hospital bed cover required for a campaign, it is necessary to estimate :—

- (a) the daily admission rate to general hospitals of
 - (i) sick (including non-battle injuries) ;
 - (ii) wounded ; and
- (b) the average duration of stay in hospital.

Non-battle casualties

85. In the past, it has been usual to compute the average daily loss from non-battle casualties, *i.e.*, sick and injured, at 0·3 per cent. of the force or 3 per 1,000 daily admissions to medical units. Experience in World War II indicates that this figure is now too high, and that it may safely be reduced *in temperate climates* to 0·15 per cent. of the force or 1·5 per 1,000 daily admissions to medical units. Further, experience has shown that approximately one-third of these admissions are not transferred to general hospitals, as they are retained in forward medical units until recovery. The total requirement of hospital bed cover for non-battle casualties is, therefore, based on a daily admission rate of 0·1 per cent., or 1 per 1,000 daily admissions to general hospitals.

It has further been established that the average duration of stay in hospital of the non-battle casualty is approximately 20 days.

For planning purposes a rough but sufficiently accurate figure for estimating the hospital bed cover percentage required for non-battle casualties is to multiply the daily admission rate by the average number of days in hospital, *i.e.*, $1 \times 20 = 20$ per 1,000 or 2 per cent. This figure of 2 per cent. should be regarded as basic, *i.e.*, unlikely

to decrease, and likely to increase in non-temperate climates, but such increase in disciplined and seasoned troops is unlikely to exceed a further 2 per cent. Therefore, a maximum of 4 per cent. hospital bed cover for non-battle casualties is arrived at.

Battle casualties

86. The overall experience of World War II in both British and American armies indicates that the average admission rate of wounded to general hospitals does not exceed 0.6 per 1,000 daily of the total force. (In N.W. Europe in 1944-1945, the actual figure for British troops was 0.48.) For the purpose of planning hospital bed cover, the average duration in hospital of battle casualties may be taken as 50 days. The bed cover percentage required for battle casualties is found by multiplying the daily admission rate by the average number of days in hospital, *i.e.*, $0.6 \times 50 = 30$ per 1,000 or 3 per cent.

This figure of 3 per cent. should be regarded as basic, *i.e.*, unlikely to decrease and liable to marked increase with the development of atomic, etc., forms of warfare (*see* para. 100).

Dispersion factor

87. To these calculations of hospital bed cover for sick and wounded, it is necessary to add a dispersion factor of 20 per cent. This is required for the following reasons:—

- (a) at any given time, a proportion of the authorized beds will be packed for shipment or move within the theatre;
- (b) the necessity for the separation of sick and wounded of various types in hospital wards means that up to 20 per cent. of the total beds may be unoccupied;
- (c) seasonal fluctuations in the incidence of disease.

Computation of total hospital beds

88. The basic percentage of hospital bed cover for a force in temperate zones is accordingly computed as under:—

For non-battle casualties	...	...	2 per cent.
For battle casualties	...	...	3 ..
			—
Total	...	...	5 ..
Add 20 per cent. of above for Dispersion			Factor
	...	...	1 ..
			—
Total percentage	...	...	6 ..

89. This figure of 6 per cent. must be regarded as the minimum. It is liable to increase :—

- (a) in a non-temperate zone or in a pandemic up by a further 2 per cent.
- (b) in atomic, etc., warfare up to a figure not yet finally computed.

Holding policy

90. After calculating the total bed cover required it is next necessary to decide the proportion of beds to be provided within the theatre of operations and the proportion outside the theatre. This depends on the *Holding Policy*. Holding Policy indicates the length in days of the maximum period of non-effectiveness for patients who will be held in the theatre for treatment. Patients who are not considered likely to be returned to duty within the prescribed period are evacuated from the theatre by the first available and suitable transport, provided they are fit to travel. The holding policy is determined by the War Office with the agreement of the force commander; it may vary for each theatre of operations and from time to time in any one theatre. It is expressed in terms of days. The determination of the holding policy depends on :—

- (a) distance of the theatre of operations from the homeland ;
- (b) operational conditions in the theatre,
- (c) availability of ships and/or aircraft for casualty evacuation.

91. In operations at a distance from the United Kingdom, *e.g.*, in Middle East, it is usually more economical in the long run to provide hospital accommodation in the theatre of operations sufficient to hold sick and wounded for a period of 120 days or longer. When operations take place within a short distance of the United Kingdom, *e.g.*, in Europe, it may be found more suitable to adopt a shorter holding policy, depending on the operational situation, the number of general hospitals overseas, and the facilities for evacuation by sea and air. Thus in the campaign in N.W. Europe, during the assault phase, only such cases as were unfit to move were retained ; as the campaign developed the holding policy was extended to 7, 30 and ultimately 42 days.

92. The D.M.S. must obtain a decision on the holding policy in the early stages of planning. Having obtained this decision, he can calculate what proportion of the percentage of beds is to be provided in the theatre of operations, and what proportion will be required outside the theatre.

93. Within the overall total of hospital accommodation arrangements are made to allot certain beds or hospitals to special categories, *e.g.*, women's services, infectious or mental cases. In addition it may be necessary to provide separate hospital accommodation for prisoners of war.

94. The army medical services are frequently required to provide hospital accommodation for the Royal Air Force and sometimes for the Royal Navy. In making his estimate of bed accommodation, the D.M.S. will ascertain what his commitments are in this respect.

In certain circumstances it may be necessary to provide hospital bed accommodation for Dominion, Colonial or allied troops, or for labourers attached to the force.

95. In formulating his plan, the D.M.S. will give consideration to the following :—

- (a) measures designed to promote health and prevent disease, *e.g.*, diet, clothing, inoculations, vaccinations ;
- (b) allotment of medical units and teams ;
- (c) methods of transportation of casualties by land, air and sea ;
- (d) arrangements for the provision and maintenance of medical equipment including special stores such as blood, plasma, crystalloids, and sera ;
- (e) adequacy of reserves of equipment of non-medical provision, *e.g.*, stretchers, blankets and disinfectants ;
- (f) provision of unskilled labour, *e.g.*, army pioneers for medical units.

96. In all planning schemes, secrecy is of the utmost importance. Although it is essential for the D.M.S. to have early information of the details of the project to enable him to make adequate arrangements for the care of the sick and wounded, he must exercise the greatest discretion to avoid being the unwitting cause of leakage of information.

97. As soon as he has gained all the information he requires and has obtained policy decisions on the major issues, D.M.S. prepares his plan and submits it for the approval of the force commander. Once approved, the plan or its main features is incorporated in the administrative orders issued by "A" branch of the staff.

98. As soon as security reasons permit, D.M.S. will communicate his plan to his representatives at lower formations.

99. The foregoing paragraphs give an outline of medical planning at the headquarters of a force. At lower levels, medical planning is on a less elaborate scale, since questions of major policy have already been settled.

100. In planning for future campaigns, consideration will have to be given to the possible use of atomic bombs, and to possible developments in chemical or other forms of warfare with their repercussions on the medical services. For example, the use of atom bombs will

cause casualties, both immediate and remote, far more numerous and more severe than those sustained in other known forms of warfare, and will produce medical problems of a special nature and magnitude.

Medical operation instructions

101. Before a planned engagement, the administrative medical officer concerned holds a conference of commanders of medical units to discuss the medical arrangements and to issue instructions for the implementation of the medical plan. After the conference it is usually desirable to confirm these instructions in writing, by the issue of a *Medical Operation Instruction*.

102. When this procedure is adopted, the medical operation instruction should follow the recognized form and sequence, suitably modified, of an operation order issued by the general staff, *viz.*:—

- (a) *Heading*.—In addition to the normal heading, under the map reference, there should be inserted a reference to the general staff operation order, to which the medical operation instruction is supplementary.
- (b) *Information and intention* should include only such information about the enemy and our own troops as it is necessary for the recipients of the order to know. It should also include information regarding the commander's intention for the battle.
- (c) *Method*.—This will detail the medical arrangements for the engagement.
- (d) *Administrative arrangements*.—These should include such details as the recipients require to know, *e.g.*, location of receiving medical units in the next higher formation, location of M.A.C. control posts, location of reserve stores of stretchers and blankets, location of advanced depot of medical stores and blood bank.
- (e) *Intercommunication*.—This should give the location of the headquarters of the officer issuing the order and instructions regarding R/T communication.
- (f) *Distribution*.—This should be to each medical unit in the formation, the motor ambulance company, "A," G, the administrative medical officer of the next higher formation (and of the flank formations if involved), war diary (two copies) and file.

103. Before the issue of such an instruction the administrative medical officer will obtain the approval of "A" branch of the staff to its contents.

104. It is usual for the administrative medical officer to be called upon to furnish a short paragraph for inclusion either in the general staff operation order under the heading *Administrative Arrangements*, or in the administrative orders when these are issued separately in connection with the operation order. This paragraph should include such information on the medical arrangements for the engagement as the troops require to know.

Medical administrative instructions

105. Instructions on professional, technical, and purely medical administrative matters will be issued periodically by the D.M.S. and his representatives at lower formations, as medical administrative instructions (M.A.I.). These will be distributed through medical channels to administrative medical officers, medical units and officers in medical charge of units. These instructions should be confined to routine matters affecting only the medical services.

106. Orders on medical matters which affect troops as a whole will not be issued by the medical branch, but will be submitted to the staff for inclusion in routine orders.

CHAPTER 5

MEDICAL ARRANGEMENTS WITHIN THE DIVISION

Regimental Medical Establishments (*Regimental Medical Companies*)

107. In war each battalion and certain other units have a medical establishment which consists of :—

- (a) R.A.M.C.—One Medical Officer and one to six N.C.O.'s, according to the unit.
- (b) Regimental—One N.C.O. provided by the unit for duty as the regimental medical officer's orderly.

Certain regimental personnel, as laid down in establishments, are detailed as regimental stretcher bearers and are placed under the orders of the medical officer. They are distinguished by a stretcher-bearer's armlet lettered S.B. worn on the left arm. In addition, personnel of the unit are specially trained in water and sanitary duties.

A number of smaller units do not carry a medical officer on their establishment but on active service have certain regimental personnel trained in first aid, water and sanitary duties. In such cases, a medical officer of a nearby unit is appointed as officer in medical charge, in addition to his other duties.

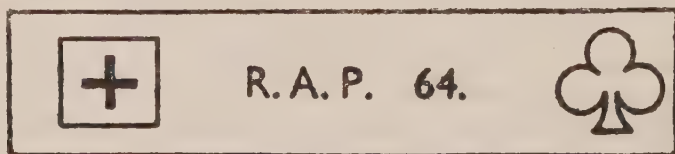
Duties of an officer in medical charge of troops

108. The officer in medical charge of a unit is directly under the control of the administrative medical officer of his formation or locality in professional matters, but in all other respects he is under the orders of the O.C. of the unit.

His duties include the following :—

- (a) To take medical charge of the unit, for which purpose he has transport and medical equipment.
- (b) To promote the highest standard of positive health and to give advice on all matters of hygiene and sanitation of the unit.
- (c) To give medical attention to the sick and injured, and to hold health inspections of the troops as may be necessary.
- (d) To aim at obtaining and maintaining a 100 per cent. standard of vaccination and inoculation in his unit.
- (e) To train the regimental stretcher bearers and the unit water and sanitary personnel in their respective duties.
- (f) By arrangement with his commanding officer, to instruct all ranks of the unit in the principles of first aid.
- (g) To maintain such medical records of the personnel of his unit as may from time to time be ordered by superior authority.
- (h) To ensure that all officers and other ranks of the unit are in their correct medical category and to make arrangements for their re-examination where necessary.
- (j) By the correct completion and submission of indents, to ensure that he has an adequate supply of medical stores to meet his requirements.

109. In every unit a billet or other accommodation will be set aside as a regimental aid post (R.A.P.). The location will be designated by a signboard carrying a red cross on a white background, the letters "R.A.P.," the serial number of the unit and the formation sign thus :—



(Bn. Aid Station)

110. The examination of men who have reported sick requires, in addition to good professional knowledge, the exercise of skilled judgment and a knowledge of human nature. Under the strain of war some men from a high sense of duty endeavour to carry on when they ought to be under treatment in a medical unit while others

exaggerate their ailments in the hope of getting away from the front ; the former category may, if in the early stages of an infectious or contagious disease, be a source of danger to others. If the medical officer is too sympathetic with the second category, he will rapidly undermine the morale of the unit, whereas if he succeeds in gaining their confidence, men will be less inclined to delay seeking his professional assistance and may thus earlier reveal the existence of unsuspected disease in the unit.

111. After examining men reporting sick, the medical officer will decide which men can be treated in (a) the unit, and which should be sent to (b) a medical unit. Those under (b) must be accompanied by a sick report (A.F. B256) or a field medical card (A.F. W3118), signed by the medical officer, and will be collected under arrangements made by the A.D.M.S. or local administrative medical officer.

112. The medical officer must see that his medical equipment is kept replenished. He should indent on the medical unit receiving the sick of his unit as soon as further supplies are required, as his unit may be moved at short notice. He should endeavour always to replenish during quiet times and avoid indenting while on the move or during an engagement, when all are working at full pressure. It should be borne in mind that first field dressings and stretcher-bearers' armbands are an Ordnance issue and are obtained direct therefrom by the units concerned.

113. On the line of march, the medical officer should normally travel near the rear of the unit column so that if men fall out or are injured he can attend to them. If he considers that they are unfit to continue the march he will attach a field medical card showing their disability and give them permission to use an ambulance car or other transport. If no transport is available they should be collected in groups on or near the route, if necessary in the charge of an orderly, to be collected later by the field ambulance accompanying the formation.

114. During quiet periods and at all other convenient times, it is most important that the men should have the opportunity of bathing and changing their under-clothing frequently. The medical officer should, at frequent intervals, inspect the men of his unit and officers or N.C.Os. in charge of bath parades should be instructed to report to the medical officer any names of men showing signs of skin disease or infestation. If steps are taken at once to deal with infected men, the incidence of disease arising from these causes can be greatly curtailed.

Regimental medical establishments during active operations

115. When information is received that active operations are imminent, arrangements should be made to form a reserve of medical equipment to meet the estimated increase in expenditure.

Security must not be prejudiced by such action.

116. The R.A.P. should normally be located in close proximity to unit headquarters centrally placed to permit access to and from all parts of the unit front. The R.A.P. should afford protection from rifle and machine-gun fire and mortar splinters. The exact site must depend on the tactical situation. If possible, the R.A.P. should be accessible to the ambulance cars of the field ambulance.

Unit R.A.Ps. should not be amalgamated.

117. In action, the regimental medical officer (R.M.O.) (*Battalion Surgeon*) should locate himself at his R.A.P. It is rarely possible and indeed it is inadvisable for him to proceed farther forward, since when he is separated from his medical equipment he can do little more than a trained stretcher-bearer; meanwhile, casualties requiring his expert aid would be accumulating in the R.A.P.

118. During battle an R.M.O. can only carry out the essentials of first aid, to preserve life and ease pain. This includes the control of haemorrhage, the immobilization of fractures and gaping flesh wounds by splints, the commencement of prophylactic treatment with sulphonamides or antibiotics, the application of dressings and the administration of morphia.

119. In an advance it is essential for the R.M.O. to keep up with his unit and he will have little time to render more than minimum essential first aid to the few casualties that occur. In such cases he must leave further treatment to the accompanying or following field ambulance section.

120. In a withdrawal the R.M.O. can render only minimum essential first aid and, though it is the responsibility of the field ambulance to evacuate from his R.A.P., he should, if necessary, assist by using all available unit personnel and transport. Also in these circumstances, the R.M.O. should send to his unit "B" echelon all except absolutely essential equipment and vehicles.

121. If casualties have to be abandoned, every possible arrangement should be made to ensure their comfort until they are taken over by the enemy. The regimental medical officer will take all possible steps to avoid capture.

122. A field medical card (A.F. W3118) and envelope (A.F. W3118a), should be made out by the medical officer for each

patient passing through the R.A.P. Brief particulars of the case, giving details of injury, the administration of morphia, the application of a tourniquet, the dosage of antibiotics, and other facts likely to be of assistance to medical officers who will subsequently treat the casualty, must be entered on the A.F. W3118, and the signature shown in block letters. Every casualty who has been given morphia will be marked prominently on the forehead with the letter "M" by grease pencil. Similarly, the application of a tourniquet will be shown by the letter "T."

123. Close liaison between the R.M.O. and the field ambulance is essential. Although the regimental medical officer should inform the supporting section of the field ambulance of any change of location of the R.A.P., it is the responsibility of the field ambulance commander to maintain touch with the R.A.P. by means of his company and section commanders.

124. In the absence of other instructions, a unit or detachment without a medical officer should apply to the nearest medical unit or medical officer for such medical assistance as it may require.

THE MEDICAL UNITS IN A DIVISION

Field Ambulance (Fd. Amb.) (*Field Medical Company*)

125. *Allotment.*—Field ambulances are allotted as follows :—

Each Infantry and Airborne Division	...	3
Each Armoured Division	... ..	2

Note.—In addition, one field ambulance is allotted to each independent infantry brigade group, one per two independent armoured brigades, and one to each army.

126. *Organization.*—All field ambulances are standard and are similar in personnel. Field ambulances with airborne divisions, in view of their special employment, have different types and scales of equipment and a minor difference in transport.

A field ambulance consists of an H.Q., a H.Q. section, and one company, which is divisible into a small company H.Q. and three equal sections similar in every way to the H.Q. section. The sections form Casualty Clearing Posts (C.C.P.) for the evacuation of R.A.Ps. and are controlled and administered by company H.Q. The field ambulance headquarters holds the bulk of the equipment and forms the Advanced Dressing Station (A.D.S.). The head-quarter section assists the A.D.S. or is used for "leap-frogging," for augmenting or relieving the company as required. The organization of the unit permits great flexibility in the methods of deployment.

127. *Role.*—The primary role of the field ambulance is the rapid collection of sick and wounded, the rendering of first aid to casualties, their preparation and classification for further disposal, and the

Collection

completion of necessary documentation. It is a mobile unit and is not equipped to provide other than the simplest accommodation and essential treatment.

When not engaged in active operations, the field ambulance may hold minor sick ; this is a secondary role and cannot be undertaken during combat, when casualties must be evacuated as soon as they are fit to travel.

128. The field ambulances of airborne formations are specially equipped and trained for their special duties. When taking part in an airborne operation each field ambulance has two field surgical teams attached, to enable the unit to operate independently during the period it is out of contact with ground forces. When a link-up with the ground forces is made, the normal casualty evacuation procedure is reverted to.

129. *On the march.*—It is usual for field ambulances to accompany brigades on the line of march, moving under the orders of the brigade commander. The brigade will usually send a “warning order” as soon as possible with the detailed movement order to follow. This warning order allows the field ambulance commander time to pack up and dispose of any sick or casualties remaining with the unit.

The detailed movement order includes :—

- (a) The position of the field ambulance in the brigade column.
- (b) The orders for the sections if accompanying battalions.
- (c) The time of passing the start point.
- (d) The route and destination.
- (e) The instructions for v.t.m. (vehicles to the mile) and the m.i.h. (miles in the hour) of the move.
- (f) The rendezvous for billeting parties.

The field ambulance commander should remember the following points when drawing up his movement orders :—

- (g) To collect the brigade sick one hour before starting.
- (h) To calculate the time taken to allow his sections to be in position to accompany battalions, if so ordered.
- (i) To calculate the time taken to move from billeting area to start point and that the time of passing the start point is the time at which the head of the unit passes the point.

130. The field ambulance when brigaded should occupy a position in the brigade line of march which will enable the unit to open an advanced dressing station immediately contact is made with the enemy.

131. Casualties from bombing, etc., on the line of march should be either carried forward in the unit transport to the end of the march or grouped in parties along the route, messages being sent to the

field ambulance accompanying the brigade or unit as to the exact location and numbers of cases in each group.

132. During all marches and particularly at night the transport officer of the unit will be responsible for ensuring that the vehicles take the correct route. It is the duty of the officer placed in charge of any part of the unit or transport to see that the regulations for v.t.m. and m.i.h. are complied with. March discipline must be strictly adhered to at all times.

133. Field ambulance headquarters, placed under command brigades for movement normally reverts to command of the A.D.M.S. on completion of the approach march, but the field ambulance company may remain under command of the brigade.

134. *During battle.*—The necessary number of sections are sited to form C.C.Ps. by the field ambulance commander in consultation with the brigade staff. The field ambulance commander will often delegate this duty to his company commander. A C.C.P. is normally sited as close as possible to the R.A.P. from which it evacuates. One or more stretcher squads of R.A.M.C. bearers will frequently be attached to each R.A.P. to form the first link in the chain of evacuation.

135. According to the extent of the front, the state of available roads, the number of anticipated casualties and the probable progress of the battle, the A.D.M.S. will order the establishment of one or more A.D.S. He will normally indicate the general area in which an A.D.S. is to open, bearing in mind the up and down traffic routes. An A.D.S. is normally sited between two and four miles from the front, in the vicinity of, or in rear of, brigade headquarters on a down traffic route. If the field ambulance remains under command or is placed in support of the brigade the actual siting is carried out by the field ambulance commander in conjunction with the brigade staff.

136. The location of all field ambulance posts must be notified by the quickest possible means to all units from which the field ambulance is responsible for evacuation, also to brigade headquarters and to the A.D.M.S.

137. To enable despatch riders (D.Rs.) and vehicles to find their way, all routes and medical posts must be clearly signposted by day and by night. The day sign will be similar to that shown in para. 109 suitably modified. The night sign can be easily improvised from *e.g.*, a non-returnable biscuit tin cut out to show a cross and the unit number enclosing a hurricane lamp with a reddened globe. As adequate signposting is essential, N.C.Os. will be specifically detailed to erect signposts as a drill at each new location, and to take them down when the post moves.

138. Field ambulances will maintain at all times medical equipment, medical comforts, stretchers and blankets sufficient for their own use and for R.A.Ps. for which they are responsible together with a reserve to cope with any unexpected increase in casualties.

Field Ambulance Section

139. The role of a field ambulance section is to collect casualties from R.A.Ps. and evacuate them without delay to the A.D.S.

It can perform this task by one of the following methods :—

- (a) by direct transportation of casualties from the R.A.P. to A.D.S. ;
- (b) by establishing an ambulance car post at an intermediate point ;
- (c) by establishing a casualty collecting post (C.C.P.).

It is often convenient to use two or more sections together, thus forming a combined C.C.P.

Before an engagement it is usual to attach one or more stretcher-bearer squads from the section to the R.A.P., and if the ground permits, one jeep or ambulance car is also attached.

140. Treatment in a C.C.P. should be confined to such first aid measures as the R.M.O. may have been unable to carry out, and first aid for cases which have not passed through an R.A.P. It is primarily a check point, and it is only necessary to ensure that haemorrhage is under control and that fractures and large flesh wounds are immobilized. Dressings and splints should not be removed unless such a procedure is essential before further evacuation. Hot sweet tea should be available. When there is an extended line of evacuation there may be occasions when it is necessary to assign to the C.C.P. its additional role of a treatment centre ; these occasions should be rare. The main object is to transmit casualties to the A.D.S. as quickly as possible.

Field Ambulance Company Headquarters

141. The role of the company headquarters is to control, administer and maintain the three company sections.

In addition the company commander will control and co-ordinate forward evacuation from R.A.Ps. and site C.C.Ps. under the field ambulance commander's direction.

The company commander will frequently visit R.M.Os. and will maintain contact with brigade headquarters staff.

142. The company headquarters will be sited where it can best control evacuation from the brigade group ; this will normally be at the junction of the lines of evacuation from all sections which are operating.

The company headquarters is not intended to be a medical post but a small amount of medical equipment is carried for the treatment of local casualties and sick.

Advanced Dressing Station (A.D.S.) (*Collecting Station*)

143. The role of the advanced dressing station is to receive casualties from one or more brigade fronts, through the C.C.Ps. or directly, and to provide essential treatment in order to render the casualties fit for evacuation as soon as possible. Speed in passing wounded through the A.D.S. is essential.

144. The A.D.S. is the main medical centre in the brigade or divisional area and is formed by the H.Q. of a field ambulance. It is equipped to provide only such surgical treatment as is essential to render casualties fit to proceed to the C.C.S., where major surgical facilities are available.

145. The A.D.S. is equipped with shelters and tents for the accommodation for casualties. It can accommodate 150 cases. It may be wholly under canvas, but the use of buildings when suitable and available is a great advantage.

146. The H.Q. of a field ambulance generally operates under the control of the A.D.M.S. division, but may occasionally be placed under the control of the brigade commander.

In the former case it will usually be possible for the A.D.M.S. to select the site of the A.D.S. only at the beginning of an engagement, particularly in mobile warfare. It will usually be the task of the field ambulance commander to select any subsequent site and to report this to the A.D.M.S. and the brigade commander or commanders concerned. When the A.D.S. serves more than one brigade, the A.D.M.S. will require to control its movement and will issue orders to the field ambulance commander accordingly, giving the approximate area in which to open, and the time for opening.

When the unit is under the control of the brigade commander, the O.C. field ambulance will normally select the site of the A.D.S. in conjunction with the brigade staff.

147. An advanced dressing station should be sited on or adjacent to good roads and requires:—

(a) An adequate "in and out" circuit for ambulance cars.

(b) Accommodation (preferably in buildings) for casualties divided into reception, treatment and evacuation zones. For the purpose of evacuation to a C.C.S. walking cases are classified as "Sitting." Certain casualties, initially walking or sitting wounded, become lying cases before they can be evacuated. Where possible, separate accommodation should be allotted to lying and sitting cases.

- (c) Facilities for treatment and documentation.
- (d) Water supply, cookhouse for patients and personnel, latrines and mortuary. Gas protection may have to be provided.
- (e) Pack store for equipment and arms.
- (f) Reserve of splints, dressings, blankets and stretchers.
- (g) Accommodation for personnel.
- (h) A M.A.C. control post should be at or near the advanced dressing station. (Accommodation for M.A.C. drivers must not be overlooked.)
- (i) Natural protection against shelling or bombing. When time permits, and particularly in position warfare, an advanced dressing station should be able to withstand direct hits from small projectiles, and slit trench protection should be provided.

148. The location of the A.D.S. must be clearly shown by day and night signs. All road junctions in the neighbourhood in all directions must be adequately signposted. All signposts must be removed on change of location. Specifically detailed N.C.O.s will carry out signposting as a drill (*see also* para. 137).

149. The staff of an established A.D.S. should be divided into teams or shifts so that rest periods can be arranged and additional staff are easily available to augment the A.D.S. when required. The personnel of H.Q. section, when with the A.D.S., should be incorporated in the teams.

150. Care and maintenance of vehicles and reliefs for R.A.S.C. drivers must be carried out and are the responsibility of the R.A.S.C. officer.

151. Special care must be taken of the personal effects of casualties immediately on admission. This is the duty of the N.C.O. in charge of the pack store, who will collect, list, pack, label and seal these articles. Particular attention must be given to money, valuables, rings, watches and articles of sentimental value.

Similar care must be taken of the personal effects of fatal cases. These effects are specially labelled and dispatched to 2nd echelon.

152. The detailed tasks of the A.D.S. are :—

- (a) *Treatment of the casualty.*—Wet and soiled clothing is removed and the patients are clad in pyjamas. They are made as comfortable as possible and kept warm and dry. Hot sweet tea and a hot meal are given to all except where medical reasons prohibit this, *e.g.*, abdominal wounds. Treatment is essential first aid. All previous treatment is checked and any omissions rectified. Tourniquets, if

previously applied, are removed ; if hæmorrhage persists, other methods are adopted for its control—*viz.*, ligature of the artery or the application of pressure forceps, failing which the tourniquet is reapplied. Sucking chest wounds are closed in by temporary means. If a limb is so shattered that it can be severed by a pair of scissors, it is removed to avoid continuance of shock. Pain is controlled by injection of morphia ; sedation of exhaustion cases is undertaken. Shock is combated by the above measures and by the use of plasma. As a general rule it is better to avoid transfusion with whole blood at the A.D.S. If, however, the chances of survival of the casualty are doubtful without blood transfusion, it should be started and preferably continued as a drip in the ambulance car on the journey to the C.C.S. The time and place for blood transfusion is normally at the C.C.S. before operation.

Every casualty to whom morphia has been administered will be marked on the forehead with the letter "M" in grease pencil. Similarly, the letter "T" will be used when a tourniquet is employed.

(b) *Documentation of the casualty.*—See Chapter 9—Documentation.

(c) *Classification of the casualty.*—Wounded will be placed in one of three priorities according to their clinical condition. These are :—

Priority 1.—Cases requiring resuscitation and/or *urgent* surgery, *e.g.*, penetrating abdominal and open chest wounds, compound fractures of the femur, extensive lacerated muscle wounds, and cases of severe shock.

Priority 2.—Cases requiring *early* surgery (and possibly resuscitation), *e.g.*, cases of severe and multiple wounds, compound fractures and head injuries.

Priority 3.—All other wounded ; these will, in general, be sitting cases.

Priorities 1 and 2 amount to 15 per cent. or 20 per cent. of total casualties.

(d) *Evacuation of the casualty.*—Casualties are evacuated according to their priorities as follows :—

Priorities 1 and 2—to the C.C.S. (or to the advanced surgical centre if formed).

Priority 3—also to the C.C.S., except those whose injuries are so trivial that they will be fit to return to duty within a few days ; they are sent to the divisional F.D.S.

153. Casualties other than wounded arriving at the A.D.S. are disposed of as under :—

- (a) Cases of severe illness or injury or cases where treatment is likely to exceed seven days are evacuated to the C.C.S.
- (b) Cases of minor illness, including exhaustion cases, are transferred to the divisional F.D.S.

154. Cases transferred to the divisional F.D.S. are moved by ambulance cars of the field ambulance ; all other cases are evacuated by ambulance cars and troop-carrying vehicles of the motor ambulance company, under arrangements made by D.D.M.S. Corps.

Field Dressing Station (F.D.S.)

155. *Allotment.*—One F.D.S. is allotted to each infantry and armoured division and to each airborne division in a ground role. All F.D.Ss. are standard in personnel, equipment and vehicles.

156. *Organization.*—A F.D.S. consists of a small administrative H.Q. and two equal sections which can operate away from the unit H.Q. but are maintained by the H.Q. The sections may operate together, separately, or be used for “leap-frogging.” A F.D.S. is designed to hold 100 cases, 40 on beds and the remainder on stretchers.

157. *Role.*—The primary role of the divisional F.D.S. is to maintain the fighting strength of the division within the division by holding all minor sick and injuries and mild exhaustion cases. Normally, only cases which are expected to be fit for return to duty in seven days are held. This period may be altered according to the local or general situation.

In special circumstances the F.D.S. may be employed in the divisional evacuation plan.

158. The F.D.S. is sited by the A.D.M.S. in consultation with the divisional staff and is normally in the rear divisional area and away from gun positions. The F.D.S. possesses shelters and tents, but should be in buildings if suitable and available.

Adequate bathing, reading and other amenities should be provided whenever possible.

159. Evacuation from the F.D.S. to the C.C.S. is by ambulance cars of the motor ambulance company, and is the responsibility of D.D.M.S. corps.

Intercommunication within the division

160. Intercommunication between R.M.Os., sections and field ambulance H.Q. is normally by despatch rider or returning ambulance car. Between A.D.M.S. and medical units it is by despatch rider, telephone or radio-telephony. Brigade headquarters may also arrange to link up to their affiliated field ambulance by R.T.

CHAPTER 6

MEDICAL ARRANGEMENTS BEHIND THE DIVISION

PART I—THE MEDICAL UNITS IN A CORPS AND ARMY

Field Dressing Station (F.D.S.)

161. *Allotment*.—The basic allotment is two field dressing stations to each corps as corps troops. The allotment of field dressing stations as army troops is one to each army and one to each corps in the Army (*see* Appendix 1).

162. *Organization*.—The organization of a field dressing station in a corps or army is the same as in a division (*see* para. 156).

163. *Role*.—The primary role of F.D.Ss. in a corps is to provide facilities for the treatment of minor sick and wounded and exhaustion cases, both in corps troops and in divisional troops who have been evacuated from divisions, and to retain such cases within the corps area to avoid further evacuation.

164. A corps F.D.S. can perform this task by :—

- (a) Treating corps troops in the same way as a divisional F.D.S. treats divisional troops (*see* para. 157).
- (b) Acting as a filter for a C.C.S. (*see* para. 198), thus relieving congestion in the C.C.S. In this capacity the F.D.S. is sited adjacent to the C.C.S.; its reception department diverts minor cases to the F.D.S. and admits severe cases to the C.C.S.
- (c) Setting up a centre for the treatment of special types of cases, *e.g.*, exhaustion cases, venereal cases or gassed cases.

165. An additional role of a corps F.D.S. is to act as a parent unit for an advanced surgical centre if formed (*see* para. 192).

166. On occasion a corps F.D.S. may be required to act as an airfield holding centre to accommodate cases awaiting air evacuation on an airstrip or airfield, pending the arrival of aircraft. If a corps F.D.S. is not available for this task, an army F.D.S. may require to be allotted. This duty is, however, usually undertaken by the medical service of the Royal Air Force by providing a Casualty Air Evacuation Unit (C.A.E.U.) for this purpose (*see* para. 331).

Casualty Clearing Station (*Evacuation hospital (semi mobile)*)

167. *Allotment*.—Casualty clearing stations are army troops allotted on a scale of three to each corps and one to an army. The required number are allotted to a corps and remain with that corps as far as possible.

168. *Organization*.—A C.C.S. is equipped to hold 200 cases, 120 on beds and 80 on stretchers. It is a tented unit and is provided with vehicles sufficient for domestic requirements only. When ordered to change location one platoon (30 vehicles) of 3-ton trucks is provided for the move.

169. *Role*.—The C.C.S. is the most forward medical unit to provide major surgical treatment and skilled nursing.

The role of a C.C.S. is :—

- (a) To provide essential major surgical treatment.
- (b) To accommodate and treat other wounded and sick until evacuated.
- (c) To hold, during non-combat periods, minor sick and wounded until cured or convalescent.

170. *Personnel*.—Each C.C.S. carries two surgeons and theatre staffs on its establishment. Each surgeon can deal, in time of battle, with approximately twelve priority 1 and 2 cases in 24 hours, allowing time for rest. This potential cannot be maintained indefinitely, as the surgeon's technique and efficiency will deteriorate after long hours of surgery. The theatre staffs (who work longer hours than the surgical staff) must also be given adequate time to clean up and to rest. An operating theatre can be used continuously round the clock by surgical teams sharing it in turn. By the addition of six field surgical teams, each team working for 12 hours, the total major surgical output of a C.C.S. is approximately 100 cases in 24 hours for a short period. The largest number of teams that a C.C.S. can conveniently make use of is eight, working in four operating theatres. The nursing in a C.C.S. is carried out by nursing officers of the Q.A.R.A.N.C. and by nursing orderlies working under their supervision.

171. An X-ray plant is available and although it is not intended that foreign bodies should be searched for and removed as a routine, this should be done if they are easily accessible.

172. In most theatres of war, and particularly in the tropics, the sick will outnumber the wounded, except during active engagements. Adequate arrangements will, therefore, be made for the accommodation of the sick. The C.C.S. will be divided into a medical and a surgical section for this purpose. The staff of the C.C.S. must be prepared to deal with sick or wounded with equal facility.

173. A C.C.S. may be employed, during non-combat periods, as a holding unit for sick and this duty may be shared with a F.D.S. in the corps area. On the resumption of active operations, all cases unable to return to their units at once must be evacuated in order to make room for battle casualties.

174. Although a C.C.S. is a tented unit, it should always be sited in suitable buildings if available, in whole or in part.

175. Extra labour for erecting tentage for stretcher bearing and for loading and unloading casualties is sometimes required. This is usually provided by the attachment of a section of pioneers.

176. A C.C.S. is sited as far forward as the tactical situation permits, taking into consideration the following factors and requirements :—

- (a) The availability of roads and buildings.
- (b) The position of railheads and airfields.
- (c) It should be located at least 1,000 yards away from any large railway junction, viaduct, depot, park or dump.
- (d) It should be at least 500 yards from the main line of a railway, or waterway, used as a main line of supply.
- (e) There must be a good " in and out " road circuit.
- (f) Ample water supply must be available or arranged for.
- (g) The site must permit of adequate dispersion and be capable of expansion.
- (h) Slit trench protection against bombing must be provided.
- (i) If the Red Cross flag or ground sign is used it must be placed so that aircraft can see the sign before arriving over the site, *i.e.*, it should be placed at the periphery of the site and not only in the centre.

177. The C.C.S. should be divided into the following areas :—

- (a) Reception, including C.O.'s office and accommodation for clerical staff.
- (b) Wards, *i.e.*, medical, surgical, infectious, gas and officers, wards.
- (c) Evacuation.
- (d) Theatre with pre- and post-operation ward, resuscitation ward, and X-ray plant.
- (e) Quartermaster stores and dispensary.
- (f) Packstore.
- (g) Cookhouses for patients and personnel.
- (h) Ablution.
- (i) Latrine.
- (j) Mortuary.
- (k) Accommodation for officers, nursing officers and other ranks.

178. Before moving a C.C.S. to a new location, whether in buildings or in tents, it is essential that a preliminary reconnaissance be made, and the sites of the various departments allotted. This will save time in opening up at the new location.

179. In marking out a new site for a tented C.C.S. a good arrangement is for the advance party to be equipped with coloured tent pegs (separate colours for each department), mallet and tape measure. The exact site of departments can then be marked off and indicated before the arrival of the main body. The lorry carrying equipment of a particular department on arrival drives straight on to the new site and much labour and time is saved in quickly erecting tentage and installing equipment. The total area required for a tented C.C.S. is approximately 200 yards by 200 yards. But, wherever possible, a C.C.S. will be accommodated in a building.

180. Once a C.C.S. is clear of patients, the time taken to pack the unit up and load it varies from two to four hours, depending on whether it is set up in a building or in tents, and also on the amount of practice the personnel have received. It requires from four to six hours to open fully in its new location, the actual time being again dependent on the above factors. In calculating a time for opening, it is necessary to add the period taken on the journey, which will depend on the distance and the speed of the transport; this again will depend on local conditions, but it is well to allow one hour for ten miles.

181. For the necessary documentation *see* Chapter 9.

182. Casualties are evacuated from C.C.S. to army and/or L. of C. hospitals by motor ambulance companies, hospital train and by air.

Field Surgical Team (F.S.T.) (*Surgical Detachment*)

183. *Allotment.*—Field surgical teams are army troops allotted on a scale of two for each armoured and infantry division, and six for each airborne division. D.D.M.S. army allots the teams to medical units in corps or army, generally two teams to each C.C.S. Once allotted they come under the control of the administrative medical officer of the formation in which they are serving.

184. *Organization.*—A field surgical team consists of a surgeon, an anaesthetist, six orderlies and two drivers. The team is mobile and self-contained with regard to transport and equipment, but it depends on the parent unit to which it is attached for maintenance and administration.

185. *Role.*—The role of the F.S.T. is to act as a mobile surgical team which can be attached to a medical unit to provide or increase the surgical potential of that unit.

186. F.S.Ts. are usually attached to C.C.S., but they may be used to provide the surgical component of an advanced surgical centre (*see* para. 192) by attachment to a corps F.D.S.

187. Two field surgical teams are attached to each airborne field ambulance taking part in an airborne operation, to provide surgical facilities until such time as the ground forces establish contact with the airborne forces when the teams are normally withdrawn. The equipment of such teams is modified to suit their role.

Field Transfusion Team (F.T.T.) (*Shock Detachment*)

188. *Allotment.*—Field transfusion teams are army troops allotted on the scale of three for each corps and two for each army. D.D.M.S. army allots teams to medical units in corps or army; one team is usually allotted to each C.C.S. Once allotted they come under the control of the administrative medical officer of the formation in which they are serving.

189. *Organization.*—A field transfusion team consists of one officer who is a specialist in blood transfusion, two transfusion orderlies and one driver. The team is mobile and self-contained with regard to transport and equipment but depends on the parent unit to which it is attached for maintenance and administration.

190. *Role.*—The role of the F.T.T. is to provide resuscitation and transfusion in a medical unit to which it is attached. The officer is nominally employed in the pre-operation ward organizing transfusions, and selecting resuscitated cases for operation.

191. F.T.Ts. are usually attached to a C.C.S., but one may be used to provide resuscitation and transfusion services to an advanced surgical centre (*see* para. 192) by attachment to a corps F.D.S. The normal proportion of F.T.Ts. to F.S.Ts. is 1 to 2, but an F.T.T. may be reinforced by the attachment of a second transfusion officer from the pool authorized for a base transfusion unit (*see* para. 275).

Advanced Surgical Centre (*Mobile Army Surgical Hospital*)

192. An advanced surgical centre is formed by attaching one or more field surgical teams and field transfusion teams to a corps field dressing station. The O.C. of the latter unit commands the centre.

193. An advanced surgical centre is formed *only* when the length of lines of evacuation, the terrain, or overriding military priority on the use of roads precludes the siting of a C.C.S. in a sufficiently forward area. The governing factor to be taken into consideration in establishing an advanced surgical centre is the time taken for a casualty requiring urgent surgery to reach a C.C.S. If the time taken is over six hours the formation of an advanced surgical centre will have to be considered. The use of chemotherapeutic and anti-biotic agents has had the effect of considerably extending the time

interval between wounding and operation without detriment to the patient. In the future, the use of new agents of this nature may be expected to extend the safety period still further and so diminish the need for establishing an advanced surgical centre.

194. In deciding on the alternative of opening an advanced surgical centre or transferring casualties to a C.C.S. the D.D.M.S. corps will take the following points into consideration :—

- (a) The post-operative nursing facilities in an advanced surgical centre are meagre and cannot provide the standard of nursing available in a C.C.S. with its establishment of Q.A.R.A.N.C. Consequently it will be necessary to deplete the nursing staff of the C.C.S. temporarily by the attachment of four or more nursing officers to the advanced surgical centre.
- (b) In general, severe cases tend to travel better before operation than immediately after. Patients with penetrating wounds of the abdomen cannot be moved for a period of up to seven days after operation without serious, or even fatal, detriment to their condition. The necessity for retaining such cases means that the advanced surgical centre will have to remain in its location for a period up to seven days after it ceases to admit cases, or if it moves, will have to leave behind adequate facilities for nursing such patients ; the satisfactory administration of small isolated medical detachments of this nature may be difficult.
- (c) The time factor referred to in para. 193.

195. As an advanced surgical centre is intended to provide only urgent and essential surgery in the forward area, it will deal only with casualties classified as priority 1 and 2, and priority 3 cases will be sent direct to the C.C.S. Admissions to the centre must be carefully controlled in relation to its operating potential, so that it does not become overcrowded. If casualties occur in such numbers as would be likely to flood the capacity of the advanced surgical centre, causing a delay of some hours before operation, the excess numbers must be sent direct to the C.C.S. even though they may require urgent operation, since the C.C.S. in this case will be able to operate sooner and it can accommodate large numbers of casualties with greater ease.

196. As soon as tactical or other considerations permit the C.C.S. to be opened, the advanced surgical centre should be closed.

Corps Medical Centre

197. It is an accepted principle that subject to the requirements of the tactical situation greater efficiency will result from the concentration of field medical units than from their dispersal. The policy

of concentration should therefore be adopted when the tactical situation permits. In the case of a corps, it is sometimes possible, except in mobile warfare, to group the corps medical units (or as many of them as are available for this purpose), together in one medical area, thus forming a *Corps Medical Centre*.

198. The advantages of this arrangement are :—

- (a) It simplifies the evacuation procedure from divisions and the work of the M.A.C. drivers, since all casualties from divisions are sent to one centre, instead of having to be directed to a particular C.C.S., or
- (b) it eases distribution within the corps medical units, since all casualties are received and classified centrally and rapidly distributed according to their clinical conditions, *i.e.*, those requiring operation are admitted to the receiving F.D.S. the remainder being filtered off either to the F.D.S. admitting minor cases, or to the F.D.S. allotted for the treatment of special cases such as exhaustion or venereal disease.

199. The success of a corps medical centre depends on the efficiency of the reception and distribution arrangements. An experienced officer, generally the officer commanding the receiving F.D.S., is appointed casualty distribution officer to control and distribute the cases on arrival at the centre. In the case of admissions to the C.C.Ss. he will be guided by the numbers of cases awaiting operation in the resuscitation or pre-operative wards. One C.C.S. will normally be kept closed and in reserve ready to move forward at short notice under orders of D.D.M.S. Corps.

200. A diagram giving a suggested layout of a corps medical centre is on page 42.

Special treatment team

201. This team is allotted on the scale of one to each corps as army troops. The role of the team is to provide specialist treatment for cases of venereal disease in the forward areas. It is self-contained with regard to transport and equipment, but is dependent on a parent unit for maintenance and administration. It is usually attached to a corps F.D.S.

Ophthalmic team

202. This team is allotted on the scale of one to each corps as army troops. The role of the team is (a) to treat eye injuries, and (b) to prescribe and provide or replenish spectacles in the forward areas. It is mobile and carries its own equipment including stocks

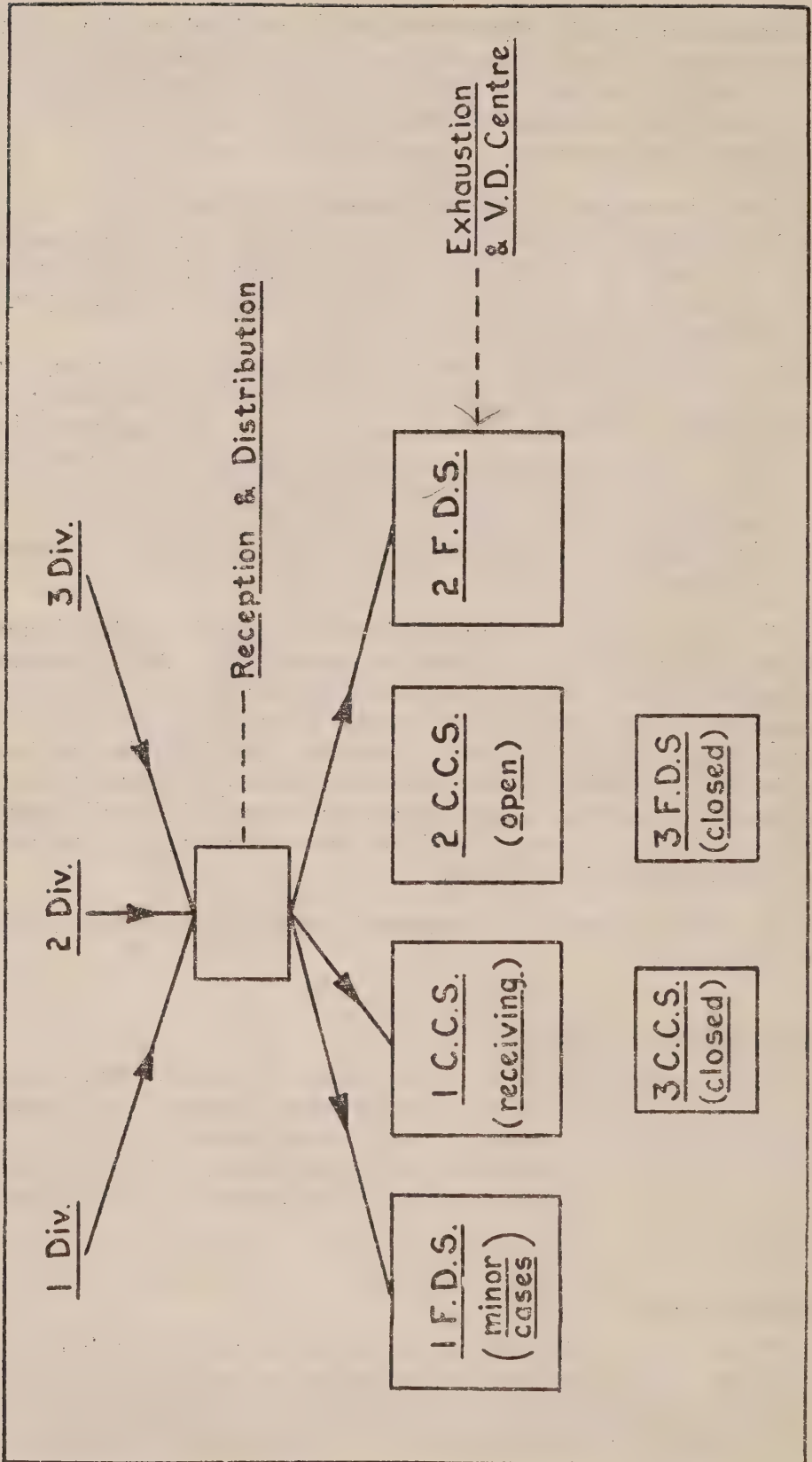


FIG. 2.—SPECIMEN LAYOUT OF A CORPS MEDICAL CENTRE.

of lenses and spectacle frames, but is dependent on a parent unit for maintenance and administration. It is generally attached to a C.C.S.

Ear, nose and throat team

203. This team is allotted on the scale of one to each corps as army troops. The role of the unit is to provide specialist treatment for ear, nose and throat cases, in the forward areas. It is mobile and carries its own equipment, but is dependent on a parent unit for maintenance and administration. It is usually attached to a C.C.S.

Maxillo-facial surgical team (*Maxillo-facial detachment*)

204. This team is allotted on the scale of one to each army; additional teams are provided for G.H.Q. troops on an as required basis. The role of the team is to provide specialist treatment for maxillo-facial injuries. Medical, dental and nursing officers are included in the establishment. The team is self-contained with regard to transport and equipment, and can be split into two smaller teams, each capable of working independently. It is dependent on a parent unit for maintenance and administration.

Neuro-surgical team (*Neuro-surgical detachment*)

205. This team is allotted on the scale of one to each army; additional teams are provided for G.H.Q. troops on an as required basis. The role of the team is to provide specialist treatment for neuro-surgical cases. Medical and nursing officers are included in the establishment. The team is self-contained with regard to transport and equipment, and can be split into two smaller teams, each capable of working independently. It is dependent on a parent unit for maintenance and administration.

The Motor Ambulance Company R.A.S.C. (*Medical Ambulance Company (Separate)*)

206. *Allotment*.—Motor ambulance companies R.A.S.C. (M.A.C.) are army troops allotted on the scale of one to each corps and one to each army with additional companies for base and L. of C. areas as required.

207. *Organization*.—The unit consists of a headquarters platoon, workshop platoon, two relief driver increments, three ambulance car platoons each of 30 cars and one platoon of 30 troop-carrying vehicles (T.C.Vs.). A platoon consists of five sections, each of six vehicles. In companies allotted to a corps, a medical platoon of R.A.M.C. orderlies is added.

in 90 ambulance cars
30 T.C.Vs.

The M.A.C. is a R.A.S.C. transport unit commanded by an officer of the Royal Army Service Corps, administered by the D.D.S.T. but under the operational control of the medical administrative officer of the formation to which it is allotted.

208. *Role.*—Motor ambulance companies are employed to evacuate casualties from the medical units in advance of the formation to which they are allotted and for distribution of casualties within the area of that formation. Thus the M.A.C. allotted to a corps, evacuates casualties from field ambulances and field dressing stations of the divisions under command of the corps and distributes casualties to the corps medical units. Similarly, the M.A.C. allotted to an army, evacuates cases from C.C.Ss. of corps to army general hospitals.

209. It is usual to detail one or more sections of ambulance cars and troop-carrying vehicles to a division for the purpose of evacuating casualties from the divisional medical units. The number of sections so allotted will depend on the estimated number of casualties to be evacuated. The responsibility for evacuation from the divisional medical units remains with the D.D.M.S. corps.

The officer commanding the M.A.C. should arrange for one of his officers to maintain liaison with the A.D.M.S. division and with the commanders of the medical units for whose evacuation he is responsible.

210. *An M.A.C. control post* is a point in a casualty evacuation route usually at a crossroad or road junction through which all M.A.C. vehicles working on that route pass and at which the drivers receive instructions on their next destination.

211. *An ambulance car relay post or cab rank* is a collection of two or more ambulance cars or troop-carrying vehicles placed at suitable locations on the line of medical evacuation, so that when a loaded ambulance car or troop-carrying vehicle from the forward area passes it, an empty car or troop-carrying vehicle from that relay post at once proceeds to the next relay post nearer the forward area. A constant shuttle is thus maintained and congestion avoided.

212. Control posts and relay posts may or may not, be in the same location. Each relay post should know the location of the relay post on either side of its own location.

The O.C. the M.A.C. corps will organize a series of relay posts along the evacuation route from divisions to corps or army medical units. D.Rs. should patrol the evacuation route.

213. At certain relay posts, arrangements will be made for the replenishment of petroleum, oil, etc., and canteens and rest areas will be organized for the drivers. The M.A.C. organization should

be self-contained for the supply of petroleum and oil and should not be dependent on medical units for these essential supplies.

Os.C. medical units will provide facilities for the drivers of M.A.C. vehicles to obtain food and rest in their units.

214. Ambulance cars and troop-carrying vehicles should only travel in convoy if liable to ground attack *en route*. Convoy traveling decreases the number of vehicles available and floods the receiving C.C.S. or hospital with patients. The most economical arrangement is for one vehicle to arrive at the receiving unit every five to ten minutes.

215. The headquarters of the M.A.C. will normally be sited in close proximity to the location of the D.D.M.S. corps or army so that intimate liaison can be maintained. The officer commanding the M.A.C. should also work closely with the traffic control staff.

216. Successful evacuation of the casualties from the forward area depends to a very large extent on the efficiency of the work of the motor ambulance company.

The standard of training among the drivers must be very high, particularly with regard to map-reading and the maintenance of their vehicles.

217. Each ambulance car carries certain equipment for the care and treatment of patients; the exchange of such equipment at medical units is an essential duty of the driver or car orderly. Therefore, on handing over his patients the driver or orderly will ensure that he collects an equivalent number of blankets, stretchers, hot water bottles, splints, etc., from the medical unit receiving the casualties.

Advanced depot of medical stores (*Supply detachments*)

218. *Allotment*.—Advanced depots of medical stores are allotted on the scale of one to each corps and one to each army.

219. *Organization*.—An advanced depot of medical stores consists of a main store holding section and a small mobile element consisting of two storemen, two drivers and two lorries. The floor space required is approximately 6,000 square feet.

220. *Role*.—Advanced depots of medical stores hold stocks of medical equipment to replenish forward medical units, *viz*, field ambulances, field dressing stations, casualty clearing stations, field surgical teams and such other teams as may be operating in corps or army area. The stock held in advanced depots is not adequate in range or quantity for the replenishment of base units such as general hospitals. The detailed loading of medical stores is carried

out in the advanced depot and they are delivered to forward medical units by the mobile element. (*Note* : The equipment of regimental aid posts is replenished from the nearest medical unit.)

Intercommunication within the corps

221. D.D.M.S. corps is allotted R.T. sets for intercommunication with corps medical units and with A.Ds.M.S. divisions.

Field Hygiene Section (Fd. Hyg. Sec.)

222. *Allotment*.—Field hygiene sections are allotted on the scale of one to each corps and one to each base area or sub-area.

223. *Organization*.—The section is mobile ; it is commanded by a non-medical officer and comprises sanitary assistants, workshop personnel, drivers, dutymen and a cook.

224. *Role*.—The field hygiene section supervises sanitation within the area and carries out sanitary measures requiring skilled knowledge beyond the capacity of the troops. More elaborate sanitary installations are carried out by engineer units.

Field Hygiene Company (Fd. Hyg. Coy.)

225. *Allotment*.—Field hygiene companies are army troops, allotted in the scale of one to each army.

226. *Organization*.—The unit is commanded by an officer who is a specialist in army health and consists of a headquarters, an instructional wing and six platoons ; the composition of each platoon is much the same as that of a field hygiene section (para. 223), but only two of the platoons have workshop personnel.

227. *Role*.—The instructional wing of the field hygiene company is designed to train up to 200 at any one time. Two of the platoons are available for detachment to independent divisions, or to divisions in special situations. The remaining four platoons supervise sanitation in the army area.

Field Medical Company (Fd. Med. Coy.)

228. *Allotment*.—Field medical companies are allotted on a basis of one per army and on an as required basis for L. of C. and base areas.

229. *Organization*.—A field medical company consists of a headquarters and an establishment of personnel, transport and equipment for a number of medical reception stations which vary in size from 5 to 100 beds. The headquarters is designed to administer

medical reception stations up to a maximum of 350 beds. In addition it carries on establishment a pool of medical officers for duty as officers in medical charge of troops in the area.

230. *Role*.—The Fd. Med. Coy. provides medical cover for small dispersed units in the army L. of C. or base areas, by forming medical reception stations of a suitable size.

Medical Forward Treatment Unit (M.F.T.U.)

231. *Allotment*.—Medical forward treatment units may be allotted as army troops in tropical or sub-tropical areas or elsewhere if required on the basis of one to each corps.

232. *Organization*.—A medical forward treatment unit is organized into a headquarters and four sections, one or more of which may be detached. It is capable of treating 1,000 minor cases. There are 100 beds and 900 stretchers for patients.

233. *Role*.—Originally designed for the treatment of malaria cases in the forward area, medical forward treatment units are, in effect, general hospitals on a light scale, equipped to deal with sick (rather than wounded) who are likely to be fit to return to duty within a limited period. They are used to save transportation of sick to the base, and are normally sited in the corps maintenance area. The beds count against the total allotment of hospital beds in the force.

Convalescent training depot (*Convalescent camp*)

234. *Allotment*.—Convalescent training depots are allotted as army troops on the basis of one to each army, and as G.H.Q. troops on a scale to provide a total of 1 per cent. of the force.

Convalescent training depots (women's services) for 150 or 300 women (including 10 per cent. officers) are provided on an as required basis.

235. *Organization*.—A convalescent training depot consists of a headquarters and four companies each of 250 men, so that it can accommodate 1,000 convalescent trainees. An officers convalescent wing for 100 officers is attached where necessary.

A convalescent training depot for women's services consists of a headquarters and two or four platoons each of 75 women.

236. Convalescent training depots are R.A.M.C. units. The medical staff consists of four officers including the commanding officer and five orderlies; the remaining staff are infantry officers and other ranks, chaplains, dental officers and instructors in physical training.

237. *Role.*—The role of the convalescent training depot is to rehabilitate patients discharged from C.C.Ss. and general hospitals to a physical and mental standard which will fit them to perform full duty on rejoining their units. Patients should not be sent to a convalescent training depot until they are fit to walk and to eat ordinary diet.

238. Convalescent training depots will be sited on the principles laid down for a C.C.S. or general hospital. The camp space required is approximately 40 acres.

The following are necessary :—

- (a) A parade ground.
- (b) Dining halls for the accommodation of 1,000 men.
- (c) Gymnasia (usually at least two are required), a physiotherapy department, lecture rooms, theatre and institutes.
- (d) Bathing and laundry facilities.

239. The important points in connection with the training carried out in these depots are :—

- (a) Graduated exercises to restore physical fitness.
- (b) Recreation and amusement.
- (c) Remedial treatment for those in need of such treatment.
- (d) The maintenance of discipline with the elimination of all irksome features.
- (f) Purposeful training in the use of arms.

240. The object is attained by grading the trainees into categories. On admission, they are placed in the appropriate category and put through a short course of physical exercises of a light and interesting character, but calculated to bring all the muscles of the body into play. It is often advisable to place certain types of post-operative cases in special groups, *e.g.*, herniotomies, appendicectomies, and those with internal derangement of the knee joint, so that they may receive such treatment as is calculated to meet the needs of their particular injury or condition.

241. In the next category, the exercises last longer and make a greater demand on the soldier's physical energy. In the highest category, more strenuous exercises and games, route marches and military training are carried out until the soldier has become fit to carry out all the duties required of him in his particular medical category and arm of the service.

242. A wide range of recreation, both outdoor and indoor, should be provided and should include a cinema and concerts. Particular attention should be paid to food and cooking, which should be as varied as possible, and in contrast to the necessarily limited range

of cooking in a unit in the forward area. Well-cooked and attractive meals exercise a beneficial influence in hastening the restoration of physical fitness.

243. In regard to discipline, men should be informed that they must conform to orders and that breaches of the rules will necessitate the introduction of disciplinary measures which must necessarily entail more or less discomfort to all.

244. Before a trainee is discharged from a convalescent depot, he should be carefully inspected by the officer commanding, who should satisfy himself that the man has been placed in his correct medical category and is fit for all duties he may be required to perform while he remains in that category.

245. Those trainees who fail to regain their fitness within a reasonable time should be brought before a medical board.

Mobile bacteriological laboratory

246. A mobile bacteriological laboratory is allotted on the scale of one to each corps. Its role is to provide laboratory facilities for the investigation of cases of disease in forward medical units. It consists of a specialist in pathology, two laboratory assistants, two drivers and two vehicles one of which is specially fitted up as a laboratory. It is attached to a C.C.S. or other medical unit for maintenance and administration.

Mobile hygiene laboratory

247. A mobile hygiene laboratory is allotted on the scale of one to each army. Its role is to provide facilities for the chemical investigation of problems affecting the health of the troops. It consists of specialists in army health, two laboratory assistants, two drivers and two vehicles one of which is specially fitted up as a laboratory. It is attached to a medical unit for maintenance and administration.

Mobile malaria field laboratory (*Malaria survey team*)

248. In a malarious area, a mobile malaria field laboratory is allotted on the scale of one to each army or for any independent force. Its role is to provide facilities for investigation and control of malarial problems in the field. It consists of a specialist in army health, two malariologists and an entomologist, with laboratory assistants, and drivers for the five vehicles. It is attached to a medical unit for maintenance and administration.

Malaria control company (*Malaria control detachment*)

249. A malaria control company is allotted on the scale of one to each army in malarious regions. The role of the unit is to control civil labour for undertaking anti-malaria measures. It consists of a headquarters and one section for each corps in the Army.

PART II.—MEDICAL UNITS IN L. OF C. AND BASE

Ambulance trains (*Hospital trains*)

250. *Allotment.*—Ambulance trains are G.H.Q. troops allotted on a scale of two per three divisions in the force with a reserve of 20 per cent. The actual number required will depend on the scale of the campaign, the distance of the area of operations from the base ports and the extent of air evacuation.

251. *Organization.*—Ambulance trains are transportation units staffed by R.A.M.C. officers (including an O.C. train), Q.A.R.A.N.C. officers and R.A.M.C. other ranks. They are equipped to provide medical attention and food on the journey. The standard capacity in trains for an expeditionary force is for 250 lying cases.

252. When the number of ambulance trains is insufficient, the transportation service improvise temporary ambulance trains from available suitable rolling stock fitted with special apparatus for the carriage of casualties.

253. *Role.*—Ambulance trains operate from ambulance train rail-head (which may be as far forward as corps area but is usually in army area) through L. of C. to base areas and ports. The movement of ambulance trains is controlled by Q. movement branch on the advice of the medical branch at G.H.Q. or army headquarters.

254. O.C. train should draw up a scheme for entraining and detraining patients.

255. An officer of the unit from which the patients are being transferred will hand over the patients and their documents together with a nominal roll in duplicate. The patients' documents should be attached to the individual if possible.

256. An ambulance train depot should be established at the base rail terminus to maintain a stock of ordnance and medical equipment for issue to ambulance trains. Personnel to staff this depot should be borne on the strength of a field medical company and attached to the transportation staff.

General hospitals (*General hospitals*)

257. *Allotment*.—General hospitals are allotted on a scale to provide the number of hospital beds in accordance with the percentage decided on in the planning stage of the campaign. This percentage varies according to the nature of the campaign and the climate and the policy regarding the length of time casualties are to be held in the theatre of war (*see* Chapter 4).

258. *Organization*.—General hospitals are so organized that staff and equipment can be adjusted to the number of beds required. Their establishments are on a sliding scale from 50 beds increasing by 50 beds to 300 beds, and thereafter by 100 beds to 1,200 beds. A common requirement is for hospitals of 600 beds or 1,200 beds. All are capable of crisis expansion as a temporary measure.

259. General hospitals with 300 or more beds are divided into medical and surgical divisions with a medical officer specially selected for his professional ability in charge of each division.

260. To facilitate movement of general hospitals of 200 beds and over, the scales of equipment have been designed to provide a headquarters light section, a headquarters heavy section and blocks of equipment each for 50 beds, the tentage being provided on a similar basis.

The equipment of the headquarters light section provides for the administration of one-third of the total number of beds plus the total surgical potential.

A general hospital can therefore move in blocks, open quickly and subsequently build up in size. For sea voyages the block system allows the equipment to be split between two transports thus diminishing the risk of total loss by sinking, and it can be divided between the ships in such a manner that sufficient is available in either ship to enable the hospital to open at least to a limited extent.

261. *Role*.—General hospitals are fully equipped hospitals and afford treatment for any disease, injury or wound. Certain general hospitals are selected for treating special types of cases and the necessary specialist medical officers or specialist medical teams are included on the staff or attached, *e.g.*, burns team and chest surgery team.

262. General hospitals are located in base and L. of C. areas. Several hospitals are often grouped in an area, particularly at the base.

When the lines of communication are long and military conditions permit, one or more general hospitals should be located at convenient sites between the front and the base, along the L. of C. This effects economy in the use of transport such as ambulance

cars, ambulance trains or aircraft, and facilitates the early return to their units of men who become fit.

263. It is usual to allot one or more general hospitals to an army; such a hospital will normally be located at an ambulance railhead, and its functions are :—

- (a) to act as a holding unit for casualties pending their evacuation to the base ;
- (b) to act as an advanced L. of C. hospital for sick during non-operational periods.

264. The principles laid down in para. 176 for the location of C.C.Ss. apply generally to general hospitals. The site must be approved by Q. Although equipped with tentage, general hospitals will be located in buildings wherever possible, and this should be an overriding priority in the allotment of available accommodation by the Q staff, failing which the provision of hutting will have to be considered. The space required for a tented general hospital of 600 beds is approximately 500 yards by 300 yards or about 30 acres ; a general hospital of 1,200 beds requires approximately 50 acres.

265. It is usual to attach one or more sections of pioneers to assist in the pitching or striking of tents and for general duties in the hospital outside the wards.

266. In planning a tented or hutted general hospital, the following points require attention :—

- (a) The C.O.'s office and administrative block should be centrally situated, preferably alongside the reception block.
- (b) The entrance should lead into a reception section which should be large enough to hold up to 30 stretcher cases and be close enough to the entrance to avoid long carriage from the vehicles bringing the cases to the hospital. The records clerks' office should be adjoining the reception section to facilitate the recording of admission and discharges and the answering of queries with reference to patients. A card index system which gives all particulars relating to each admission greatly adds to the efficiency of the record office and the ease with which queries regarding patients can be investigated.
- (c) The reception section should be connected by covered passages with the wards for serious cases, and with the operating theatre.
- (d) The kitchen should be close to the dining room and connected both with it and the wards by covered ways.
- (e) Adequate accommodation should be provided for patients' recreation, and a N.A.A.F.I. canteen should be opened as soon as possible.

267. On admission, evacuation and discharge of patients, the procedure indicated in following sub-paragraphs should be adopted:—

- (a) Admission. Each hospital should maintain a reception staff which should consist of a medical officer, one or more clerks and a representative of the quartermaster's pack-store (to take over kits and valuables and issue receipts for the same on A.Bs. 182 or 191) and a suitable number of stretcher squads and men to conduct and assist walking patients. On arrival, the patients are taken to the reception section where they are inspected by the medical officer on duty and assigned to particular wards according to the nature of the disability. Their particulars are taken by one of the clerks. All cases on arrival in their wards are examined by the officer-in-charge of the division or his representative to decide on the treatment required.
- (b) Evacuation. Officers-in-charge of divisions will, each day, submit a list to the commanding officer showing the number of patients by categories who are available for evacuation. The commanding officer will consolidate these lists and on receiving information that a convoy of patients is to be despatched from his hospital will instruct the officers-in-charge of divisions to prepare a selected number of patients for despatch. He then inspects the patients selected and satisfies himself that they are suitable for transfer, that documentation has been completed and nominal rolls prepared.
- (c) Discharge. All patients should be seen by the C.O. before discharge.

268. For documentation *see* Chapter 9.

Central pathological laboratory

269. A central pathological laboratory is allotted for each theatre. Its role is to carry out major pathological investigations and research. It is attached to a general hospital at the base for maintenance and administration.

Base malaria field laboratory (*Malaria survey team*)

270. In malarious theatres a base malaria field laboratory is allotted to the force. Its role is to conduct malarial surveys, prepare malarial maps, carry out experimental and research work and impart instruction in anti-malarial measures. It is mobile and is attached to a parent medical unit either at the base or L. of C. for maintenance and administration. The officer in charge also acts as adviser to the D.M.S. if a consulting malariologist has not been appointed to the force.

Beach Medical Unit (B.M.U.) (*Medical Battalion Engineer Special Brigade*)

271. *Allotment*.—In assault landings a beach medical unit is allotted to each beach group.

272. *Organization*.—A beach medical unit consists of three medical officers, three non-medical officers and 69 other ranks; the transport includes three amphibians. Pioneers or infantry of the beach group are attached as stretcher-bearers.

273. *Role*.—The role of a beach medical unit is (a) to take care of casualties occurring on the beach both amongst beach troops and assaulting formations so as not to immobilize the field medical units of the latter and (b) to form a casualty embarkation point (C.E.P.) for the documentation and dispatch of casualties to vessels at sea, pending the opening of a port.

Base Transfusion Unit (B.T.U.) (*Blood Transfusion Detachment*)

274. *Allotment*.—One base transfusion unit is provided for each theatre of operations. The standard unit is based on the requirements of a force of the army of two corps. For each additional corps or for each additional army, additional personnel and transport are authorized for the unit.

275. *Organization*.—The unit consists of a headquarters, one blood-collecting section to each army and one forward distributing centre to each army. Blood refrigeration lorries are included in the transport. Where it is possible to supply whole blood to the base transfusion unit from resources outside the theatre the blood-collecting section or sections of the establishment is not implemented. Where it is not possible to supply the theatre with dried plasma from resources in the United Kingdom, a plasma processing section with the necessary staff is added to the headquarters. The unit carries on its establishment a pool of blood transfusion officers to reinforce field transfusion teams or other medical units as required.

276. *Role*.—The role of the unit is to provide and distribute throughout the force, supplies of whole blood and fluid plasma, with the necessary giving sets.

Note: Dried plasma and crystalloids are issued through base depots of medical stores—para. 278.

Blood is obtained from the United Kingdom or from donors at the base; forward distribution is effected by maintaining an advance blood bank of two refrigerator lorries in each corps. The O.C. unit also acts as adviser in resuscitation and transfusion to the D.M.S.

Supply of medical equipment in the field

277. Medical equipment for an expeditionary force is held in depots of medical stores in the theatre of operations. These depots are supplied from the medical stores depots in the United Kingdom or under special arrangements from other countries.

Base depot of medical stores (*General Depot, Medical Section or Medical Branch Depot*)

278. *Allotment*.—A base depot of medical stores is provided for each 150,000 of the strength of the force. It is equipped initially with sufficient stocks for two months' maintenance of that number. A base depot is usually located in a port area. The floor space required is approximately 50,000 square feet.

279. *Organization*.—A base depot of medical stores is organized in five sections :—

- (a) Central control section (Headquarters). This section exercises administrative control and maintains the medical equipment accounts. All issue and receipt vouchers pass through this section, which enables the officer in charge to take provision action for replenishment of stock.
- (b) Traffic section. This section is divided into two sub-sections, one of which handles the inward traffic, the other packing and dispatching outward consignments.
- (c) Supply section. This section is responsible for binning all receipts from the traffic sub-section, and for selecting stores to meet issues for outgoing consignments according to the indents received from Central control. It is divided into three or more sub-sections to deal with the full range of medical equipment.
- (d) Repair section. In this section minor repairs are carried out by R.A.M.C. tradesmen.
- (e) Regimental section. This is responsible for all matters connected with the interior economy and administration of the unit.

It is usual to attach a section of pioneers or to employ local labour for the handling of bulk equipment within the depot.

280. *Role*.—The role of a base depot is to maintain adequate stocks of medical equipment and to despatch supplies to the medical units for which it is responsible in base and L. of C. areas and to advanced depots of medical stores (para 218).

281. A Returned Store and Repair Section R.A.M.C., including a R.E.M.E. sub-section, is established in selected base depots of medical stores, to carry out major repairs and also to provide mobile repair teams to visit hospitals, etc., and effect a maintenance

service *in situ*, particularly of bulky equipment such as X-ray plants, high pressure sterilizers and anaesthetic apparatus.

282. When more than one base depot of medical stores is established in a theatre one is nominated as the central base depot of medical stores and given an increment of staff. The central depot receives all imported stores and distributes them to other base depots.

283. A small team of R.A.M.C. other ranks known as a *Port Detachment R.A.M.C.*, is attached in each theatre to a docks operating company R.E. or other convenient unit in the port area to assist in the identification and dispatch of imported medical equipment to the central base depot of medical stores.

Maintenance of medical equipment in the field

284. In the initial stages of an expeditionary force operating overseas automatic shipments of agreed standard quantities of medical equipment are arranged from the United Kingdom. This system of block supply is designed to meet the needs of the force in the early stages. Delivery may be made direct to beach units, base depots C.C.Ss., general hospitals, advanced or base depots. Adequate medical stocks cannot be maintained indefinitely by automatic supply on a pre-determined fixed scale. Accordingly, as soon as the first base depot of medical stores is established, it will assume responsibility for distribution and maintain replenishment of stock by demands on the War Office (AMD 3) submitted through D.M.S. of the force. If and when a central base depot of medical stores is established (para 282) it will become responsible for submitting all provisioning demands from the theatre.

When the expeditionary force is operating from a base in a friendly country, a base depot of medical stores will be shipped from the United Kingdom at a very early stage of the build-up.

Hospital ships (*Hospital Ships*)

285. Hospital ships are not maintained in peace. They are passenger vessels which are taken over and fitted on mobilization. The War Office decides the number of hospital ships required; this depends on the location of the theatre of war, the length of the sea voyage, the holding policy in the theatre and the amount of air-lift available for casualties.

286. Hospital ships are fitted out by the Sea Transport Department in accordance with War Office requirements. All ships are

based on some port where the embarkation medical authority representing the D.G.A.M.S. should consult with the senior sea transport officer at the port on any alterations which he wishes carried out.

287. Hospital ships are classified as :—

(a) Long sea voyage.

(b) Short sea voyage.

288. Long sea voyage hospital ships are staffed and equipped to provide all the facilities of a general hospital. They are in effect floating hospitals with accommodation for 200 to 800 patients. The O.C. troops is a medical officer and is assisted by a staff of R.A.M.C. and Q.A.R.A.N.C. officers, including specialists and other ranks.

289. Short sea voyage hospital ships (previously known as hospital carriers) are usually converted steamers of the cross-Channel type capable of accommodating 200 to 300 patients. They are used for voyages up to 72 hours' duration.

Their staff and equipment varies with the distance of the voyage, *e.g.*, if they are employed on the cross-Channel route they are not equipped with an operating theatre.

290. Hospital ships are protected by the Geneva Convention and consequently are not available for the transport of armed personnel or war material. These vessels fly the Red Cross flag; their hulls are painted white with a green band; they display the Red Cross emblem on either side, and they are illuminated at night. Only casualties and personnel of the medical or chaplains services can be embarked.

Ambulance transport

291. An ambulance transport is a vessel which is used on the outward voyage for the transport of troops, and on the homeward voyage for the transport of casualties. It has no distinguishing marks and claims no protection under the Geneva Convention. The medical staff and equipment is little more than that of an army troopship. Consequently it is used only for the transport of minor cases of sickness or wounds or convalescent cases and is not used at all if a hospital ship is available.

CHAPTER 7

EVACUATION AND TRANSPORTATION OF CASUALTIES

General

292. The medical services in the field are organized to effect rapid evacuation of casualties, *i.e.*, wounded, sick and injured. The efficiency with which this system is organized and administered greatly affects the mobility and morale of the Army.

293. A soldier who for any reason becomes unfit to perform his duty in the field is a hindrance to the efficiency of the force, and his presence among fighting troops tends to lower morale. He must, therefore, be evacuated as speedily as possible to a medical unit where he can be properly treated and restored to health, or otherwise disposed of according to the nature of his wound or disability. At the same time it is important that he should not be evacuated farther to the rear than his condition warrants.

Calculation of casualties

294. In making arrangements for the evacuation of casualties from a force in the field, two categories have to be considered :—

- (a) Sick and injured (non-battle casualties).
- (b) Wounded (battle casualties).

Non-battle casualties

295. The daily admission to medical units of *sick and injured* is calculated at 0.15 per cent. of the force. This figure, in the absence of an epidemic, *e.g.*, influenza, has proved to be an adequate estimate for a campaign in a temperate zone. In the tropics, endemic diseases, especially malaria, may easily cause an increase in the daily admission rate up to 0.3 per cent. of the force ; the latter figure allows for seasonal variation, and should never be exceeded if adequate measures of health discipline and preventive medicine are adopted. It should be noted that the admission of sick and injured is a more or less continuous daily commitment, whereas the admission of battle casualties (*see next para*) varies from day to day.

Battle casualties

296. The number of battle casualties in any engagement depends on several factors, principally :—

- (a) the relative strengths and relative fire-power of the ground and air forces engaged, and
- (b) the nature of the operation, whether attack or defence.

The general staff should therefore be consulted and asked for an estimate.

297. Although it would be injudicious to adhere to a rigid formula for estimating battle casualties, the following statistics from World War II may be used as a guide. They may not be applicable to a particular situation or to possible future forms of warfare.

Battle Casualties (including killed) expressed as a percentage of formation strength

<i>Formation</i>		<i>Daily Average for all days in action</i>	<i>Severe battle day</i>
Brigade ...	...	2.5 per cent.	12-15 per cent.
Division ...	...	1.0 per cent.	5-6 per cent.
Corps ...	...	0.5 per cent.	2-3 per cent.

298. The figures given in paras 295 to 297 must not be confused with those given in Chapter 4, which deals with the estimate of hospital bed cover in general hospitals, expressed as a percentage of the strength of the whole force.

Proportion of killed to wounded

299. Recent developments in the use of lethal weapons and the increased efficiency of modern projectiles tend to increase the proportion of killed to wounded. In World War II, the proportion of killed to wounded was approximately 1 to 3.5. Consequently the medical services should be prepared to deal with some 80 per cent. of the total estimated casualties.

Recovery rate of wounded

300. Statistics of World War II show that 92 per cent. of all wounded recovered; approximately 14 per cent. of wounded were subsequently invalided.

Calculation of transport

301. In calculating the transport required, it may be assumed that :—

- (a) In the region of the front line 40 per cent. of the wounded require to be carried on a stretcher by hand or by jeep ambulance or ambulance car, and 60 per cent. are fit to make their own way back to the regimental aid post or to the casualty collecting post.
- (b) From the C.C.P. to the medical units in the rear, transport is required for 100 per cent. of the wounded; of these approximately 40 per cent. are lying and 60 per cent. sitting.

302. In mobile warfare it is rarely possible to retain sick in the divisional or corps area, and all have to be evacuated. In position warfare about 50 per cent. of the daily sick can be treated in divisional or corps medical units and should be fit to return to duty in a week. The remainder will have to be evacuated, but about 80 per cent. should be fit to rejoin their units within a month.

303. Cases of infectious disease are almost certain to occur and must be evacuated as quickly as possible by transport reserved for this purpose, to a hospital specially detailed for their treatment. Psychiatric cases may require an escort to their destination.

Procedure

304. The normal procedure is described in the following paragraphs, and Figure 3 shows the chain of evacuation in diagrammatic form. Modifications in detail may be necessary to meet local requirements.

When a man in a unit is wounded, he himself or the regimental **stretcher-bearers** should apply his first field dressing. He then makes his way, or, if unable to do so, is carried by the regimental stretcher bearers to the R.A.P. Here the medical officer gives such attention as may be possible, affixes a field medical card (A.F. W 3118) with his diagnosis, noting if morphia has been given, etc., and sends him to the casualty collecting post or A.D.S. If unable to walk, he is carried on a stretcher by the field ambulance stretcher-bearers or in an ambulance car to the C.C.P. Any unwounded prisoners of war who are being sent to the rear should be made use of in carrying wounded. Ambulance cars convey casualties from the C.C.P. to the A.D.S.

305. On arrival at the A.D.S. cases are dealt with as laid down in para 152, *i.e.*, they are treated, documented and sorted into priorities for evacuation. Minor sick and exhaustion cases are sent to the divisional field dressing station in the divisional ambulance cars; all other cases are despatched in the cars of the motor ambulance company to the C.C.S. in corps medical area. If an advanced surgical centre has been established, priority 1 and 2 cases are sent there for operative treatment, and the remainder to the C.C.S. in corps medical area. Cases are again sorted in the C.C.S. and minor cases are diverted to corps field dressing stations, but the majority after treatment, will have to be evacuated to a general hospital. This is carried out by motor ambulance companies, ambulance trains or air transport. In undeveloped countries, ambulance convoys may be composed of wagons, doolies, camels, mules, sledges, barges or any other form of transport available. At the general hospital, patients are retained for treatment until they are fit for duty or for transfer to a convalescent training depot, or they are evacuated to home hospitals for further treatment or for invaliding.

306. The following points should receive attention in the evacuation of casualties :—

- (a) Arms and equipment after removal of ammunition, should accompany the patient to the A.D.S., where they should be collected and disposed of by R.A.O.C.
- (b) Recording particulars of casualties, especially during a rush, may seem to be somewhat unnecessary. It must, however, be remembered that the officer i/c 2nd Echelon is dependent on this information to enable him to inform the next-of-kin. However irksome it may be at the time the recording of particulars and the nature of the wound or other disability must be systematically carried out before the casualty is evacuated beyond the A.D.S. At a later date the grant of a disability pension may depend on the accuracy of the records kept.
- (c) The greatest care must be taken to safeguard the equipment, clothing and personal belongings of individual casualties, especially of helpless ones, so that no loss occurs while they are under medical charge. All articles should be checked and recorded on the first occasion possible after the individual casualty has been taken into the charge of the medical unit.
- (d) Casualties evacuated to the base take a longer time in rejoining the front line troops than do those retained and treated in divisional, corps or army areas; also there is less possibility of their rejoining their old units owing to being passed into a reinforcement holding unit after convalescence. Whenever circumstances permit, therefore, arrangements are made by the staff for the establishment of rest stations in divisional and corps areas, to which patients may be sent for rehabilitation after their discharge from a medical unit. But in the army area or advanced base it is usual to establish a convalescent training depot for the same purpose. Economy in man-power and in transportation is thereby effected.

Evacuation of casualties from the front

307. The divisional ambulance cars operate inside the divisional boundaries from R.A.P. and/or C.C.P. to the A.D.S. and between the A.D.S. and the divisional F.D.S. It is abnormal for divisional ambulance cars to evacuate cases outside the divisional boundaries, except in emergencies, in which case the divisional ambulance cars return to their own unit on completion of the duty.

The drivers of all divisional ambulance cars must know the location of their own unit headquarters and the location of the divisional field dressing station.

The cars of the motor ambulance companies allotted to corps operate from the advanced dressing stations and the field dressing station of the division ; they evacuate cases to the casualty clearing station, or to the advanced surgical centre, if formed. Evacuation thereafter is by the motor ambulance company allotted to the army.

308. A system of route cards should be organized in the M.A.C. A route card should contain the following information :—

- (a) the name and the map location of the medical or other unit to which the driver is to proceed.
- (b) the route to be taken to reach destination.
- (c) any other necessary instructions.

All drivers should have a map of their own route.

309. The D.D.M.S. corps will keep the officer commanding M.A.C. informed on the current medical arrangements in the corps area.

The officer commanding the M.A.C. will ensure that inter-communication between his various platoons and sections are maintained. The various links of the M.A.C. chain of evacuation should be made use of to disseminate information throughout the medical organization in division and corps.

Evacuation of casualties by land

310. Apart from ambulance trains (para. 250), the standard method of evacuation by land is by motor transport allotted specifically for medical use and consequently marked with a Red Cross. This transport consists of ambulance cars and troop-carrying vehicles. There are two current types of ambulance cars (a) light and (b) heavy. The light ambulance car carries two stretcher cases or six sitting cases, and the heavy ambulance car carries four stretcher cases or ten sitting cases. An armoured type of ambulance car is under development for the purpose of carrying casualties back to the R.A.P. Troop-carrying vehicles are used for the transport of sitting cases ; each is capable of carrying 30 such cases.

311. A vehicle which was found very useful in World War II was the " ambulance jeep." This is a standard 5 cwt. 4 by 4 car fitted with a frame designed to carry two stretcher cases longitudinally. When used for casualty evacuation it is usual to display the Red Cross as a distinguishing mark. In inclement weather, it is advisable to enclose the framework in a canvas covering to afford protection. Ambulance jeeps are particularly useful for short carries in the forward areas, where larger vehicles may be unacceptable for tactical reasons or where roads and tracks can be negotiated only by jeeps.

312. In emergency, practically any fighting vehicle can be used to get wounded away from the front line, *e.g.*, armoured personnel carriers (A.P.C.) or other types of carriers.

313. For the evacuation of casualties in undeveloped countries, it may be necessary to resort to pack ambulance transport, *e.g.*, riding ponies, horse wagons, camel cacolets, mule litters or travois or dog sledges. In such country, helicopters could often be of the greatest value (para. 326).

Evacuation of casualties by sea

314. Hospital ships are used for the transport of casualties by sea, whether for long or short voyages, but the need for their use can be reduced by the provision of air evacuation. For ideal loading, a hospital ship requires a port from which to load cases.

Hospital ships are of limited use in open road-steads, *e.g.*, in an opposed landing, since (a) being vulnerable they cannot approach too close inshore, (b) loading is difficult unless the sea is calm (c) loading is slow, since casualties have to be hoisted aboard, and this is a laborious process even with the use of stretcher slinging trays.

315. Until a port is made available these difficulties can be readily overcome in temperate waters, by making use of Landing Ships Tank (L.S.T.) for the evacuation of casualties on a short voyage up to 36 hours duration. The tank hold of these ships is capable of holding up to 300 stretcher cases by providing stretcher racks in tiers along the inside of the hold; a small surgery has also to be built in, and medical and nursing staff provided. Transport between shore and ship is provided by DUKWs (para. 319). In favourable circumstances L.S.Ts. may be beached in which case casualties can be embarked dryshod at low tide.

Landing Ships Tank are not suitable for the carriage of casualties in the tropics, because of the high temperature in the tank deck, or for long sea voyages, because of the pitching.

316. In certain circumstances accommodation for casualties can be provided in Landing Ships Infantry (L.S.I.); similarly minor cases can be accommodated in Landing Craft Infantry (L.C.I.) for short sea voyages.

Evacuation of casualties by amphibians

317. The use of amphibians is the best method of evacuating casualties,

- (a) between shore and ship in an opposed landing,
- (b) over a wide river in an assault crossing, or
- (c) in flooded or swampy country.

318. Amphibians may be either wheeled or tracked. The former are known as Landing Vehicle Wheeled (L.V.W.) and the latter as Landing Vehicle Tracked (L.V.T.). As the name implies, they are all capable of moving over land or over water.

319. The most useful L.V.W. for the transport of casualties is the DUKW, which is in effect a $2\frac{1}{2}$ -ton lorry made waterborne. The model used in World War II had six wheels for use on land with a land speed of up to 50 m.p.h. and a propeller for use in water giving a sea speed of six knots. It is capable of carrying up to 10 stretcher cases plus 12 sitting cases without modification; a loading ramp, constructed from wood or extemporized is necessary. The DUKW is particularly suited for bridging the water gap in combined operations, as it is capable of driving inside the tank hold of an L.S.T. It is probable that future models will be of larger size. A jeep made waterborne is another form of amphibian wheeled vehicle capable of carrying two stretcher cases.

320. There are several models of L.V.T. suitable for the transport of casualties over water or flooded country; the more recent models are partially armoured. One model used with success in World War II was the "Buffalo" which has a land speed of 27 m.p.h. and a speed of six knots in water; it is capable of carrying without modification five stretcher cases and 20 walking cases. Tracked amphibians have the advantage over wheeled amphibians in that they can climb up obstacles such as steep river banks without "riding." On the other hand, their tracks are liable to wear out if used for prolonged periods on road. They are specially useful for transport of casualties over rivers, swamps and flooded terrain. A small type of amphibian is the M 29C ("Weasel") useful in snow, mud and water. It can be adapted to carry two stretcher cases.

321. It should be noted that these amphibians are all-purpose vehicles. They have not been specially designed for the carriage of casualties, but in certain circumstances are particularly useful for this purpose. A number may be allotted specifically for medical use in any particular operation, or they may be used to carry reinforcements and stores forward and casualties on the return journey.

The evacuation of casualties by air

322. The development of transport aircraft has opened up great possibilities of the rapid and efficient evacuation of casualties in aircraft over long distances. The provision of aircraft for this purpose is a commitment of the Royal Air Force. Close liaison between the medical services of the Army and of the Royal Air Force is essential to ensure that whatever facilities are available are fully employed.

323. The principal advantages of air-evacuation are :—

- (a) The reduction of the time-interval between the moment of being wounded and the time at which definitive surgical or other treatment can be carried out.
- (b) The avoidance of passage by casualties over rough ground, which increases pain, discomfort and shock, and may diminish the chances of survival.
- (c) The enhancement of morale of troops in the field.
- (d) The reduction in the numbers of personnel, equipment, motor-vehicles and ambulance trains, etc., normally used for evacuation thus easing the strain on road and rail communications.
- (e) The reduction in the number of hospital beds to be provided in the theatre of operations, and in the number of hospital ships.

324. The evolution of flying has been accompanied by the progressive development of casualty air-evacuation. Between 1939 and 1945 British Army casualties evacuated by air included :—

1940–1943	North Africa campaign	...	...	60,000
1943–1945	South-East Asia	...	...	180,000
1944–1945	North-West Europe	...	...	117,000

325. The evacuation of casualties by air is a joint responsibility of the Army and the Royal Air Force.

The Army Medical Services are responsible for the collection of casualties in the field and their delivery at airfields.

The Royal Air Force are responsible for the provision and control of transport aircraft and also for the professional care of casualties from the time they are handed over by the army medical services at airfields, until they are deplaned at their destination.

The Royal Air Force provide a Casualty Air Evacuation Squadron (C.A.E.S.) on airfields to load and off-load casualties in aircraft.

The R.A.F. provide medical and nursing personnel for the professional care of casualties during flight ; also medical equipment including oxygen and food and fluids for the journey.

326. *Types of aircraft used in evacuating casualties*

These include :—

(a) *Helicopters and Light Aircraft* :—

each capable of carrying up to two lying cases, plus pilot and attendant, and used for sorties from forward air strips to corps medical centres.

Average radius of flight per sortie : 10–50 miles.

(b) *Medium-range Aircraft* :—

capable of carrying from 6 to 20 patients from airfields near corps medical centres or general hospitals in the L. of C. or Base Area. Average radius of flight per sortie : 100–1,000 miles.

(c) *Long-range Aircraft* :—

capable of carrying up to 60 casualties from general hospital areas overseas to the United Kingdom or other base areas.

Average radius of flight per sortie : 500–3,000 miles.

327. All transport aircraft are equipped with supports capable of carrying the service (Mark II) stretcher ; when not in use, the supports are stowed in the plane. Transport aircraft are used to carry personnel and stores forward, and to evacuate casualties on the return journey.

Medium and long range aircraft, which may have to travel above 10,000 feet altitude are equipped with oxygen apparatus.

328. The principal factors affecting the use of aircraft for casualty evacuation include :—

Air superiority.

Weather conditions.

Availability of aircraft and airfields.

Adequate facilities of inter-communication between various Army and R.A.F. formation H.Qs., and airstrips and airfields.

Unsuitable flying weather and the possibility of aircraft or airfields not being available, compels the retention of the existing organization for casualty evacuation by land and sea. For the time being air evacuation of casualties must be regarded as an ancillary means of transportation, though the most efficient and desirable method.

329. *Operational control of air evacuation of casualties.*—The speedy air-evacuation of casualties and resulting enhancement of surgical and other treatment can best be effected by the provision of emplaning and deplaning facilities at :—

(a) *Advanced Airstrips* which can quickly be improvised and located in divisional areas near advanced dressing stations.

Casualties from divisional field ambulances can be transferred to these Advanced Airstrips and flown by helicopter or light aircraft to Advanced Air Transport Airstrips.

Helicopter and light aircraft flying forward to advanced airstrips should always carry stretchers and blankets to replace those used in evacuating casualties.

(b) *Advanced Air-transport Airstrips.*

These are usually located in corps areas and are capable of providing landing facilities for helicopters, light and medium aircraft.

The casualty air evacuation unit located on these airstrips can unload casualties arriving by helicopter or light aircraft from advanced airstrips, and hand them over to the army medical services for treatment at the corps medical centres or other army medical units.

On the other hand casualties from the corps medical centres fit for further evacuation can be handed over to C.A.E.S.s on these advanced air transport airstrips for evacuation rearwards by medium range aircraft to Main Transport Airfields.

(c) *Main Transport Airfields*

These are normally located in army areas and within reasonable distance of general hospitals. They provide landing facilities for both medium and long-range aircraft.

The C.A.E.S. on these airfields can deplane casualties evacuated from advanced transport airfields by medium range aircraft.

They can also emplane patients from general hospitals, for rearward evacuation by long range aircraft to Base Transport Airfields.

(d) *Base Transport Airfields.*

These are located in base areas either in the United Kingdom or overseas.

They are capable of receiving the heaviest types of long-range transport aircraft.

The C.A.E.S. on these base transport airfields can unload casualties arriving from general hospitals in base areas, and hand them over to the army medical authorities for further treatment at base hospitals and special centres.

330. The provision and control of aircraft is a Royal Air Force responsibility and is best effected by the army authorities notifying the R.A.F. daily of the estimated number of casualties requiring evacuation by air.

This arrangement is adequate for routine air-evacuation, particularly from main and base transport airfields; but for adequate air-evacuation rearwards from the advanced airstrips in the divisional areas, especially during battles and heavy fighting, control of helicopter and light aircraft operating from these forward airstrips should be maintained by army air liaison officers, attached to corps or army headquarters.

Divisional headquarters will signal to corps their estimated requirements for helicopter sorties. Corps headquarters will determine the relative urgency of the requests of different divisions and allot helicopter sorties appropriately.

331. R.A.F. Casualty Air Evacuation Squadron.—The C.A.E.S. is an independent self-supporting unit of the Royal Air Force containing medical and nursing officers, nursing orderlies, clerks, cooks and other administrative personnel.

Each C.A.E.S. is capable of manning :—

- Four light aircraft airstrips,
- Two advanced transport airstrips,
- One Main Transport Airfield.

Normally one C.A.E.S. is provided per army in the field. In certain circumstances two C.A.E.Ss. per army may be allotted.

332. Clinical criteria for selection of casualties for air-evacuation.—Casualties evacuated by aircraft may be exposed to lack of oxygen ; also to the effects of decompression, accelerative forces, and to cold. The movements of aircraft may induce air-sickness.

In general all casualties fit to be moved on the ground, with due precautions, can travel safely by air.

The experience of different theatres between 1939 and 1945 has suggested certain priorities :—

- Perforating wounds of the globe of the eye.
- Maxillo-facial wounds.
- Burns (especially of the face and hands) ; these patients require preliminary treatment for shock.
- Wounds of limbs and joints, which have received preliminary efficient immobilization.
- Cranial wounds.
- Pelvic and spinal injuries.
- Severe flesh-wounds.

333. On the other hand the possibility of casualties which are evacuated by air being exposed to the effects of hypoxia, cold, decompression and accelerative forces, necessitates special considerations before they are emplaned :—

- (a) Lesions such as haemorrhage or shock, producing marked reduction in oxygen-carrying haemoglobin, may become intensified by hypoxia above certain altitudes.

- (b) Effects of decompression may be harmful to thoracic and abdominal wounds, or to gastro-intestinal lesions.
- (c) Psychiatric cases may require special attendants, sedation, or occasionally restraining apparatus.
- (d) Infectious diseases such as small-pox may necessitate protection of the air crew and medical staff, and disinfection of the aircraft.

The following types of case require special consideration before air evacuation :—

Shock—(such patients require 24-36 hours preliminary treatment).

Recurrent severe haemorrhages.

Maxillo-facial injuries.

Acute thoracic and abdominal wounds or lesions.

Anaemias and leukaemias.

Cardio-vascular lesions (myocardial infacts, angina, etc.).

Respiratory lesions (where the vital capacity is greatly reduced).

Gas gangrene cases before treatment.

Infectious diseases (small-pox, diphtheria, typhoid, cerebro-spinal fever).

Mental diseases (non-quieting homicidal and suicidal).

Before being transported to airfields for evacuation, the selected patients, should receive the appropriate medical or surgical treatment to prepare them for the flight. Full clinical data should be entered on the documents accompanying such patients.

334. Serious or urgent cases are usually emplaned in such manner that they can be off-loaded first at their destination. The method of loading will vary with the type of aircraft and the arrangement of tiers of stretchers. During flight medical attention is given by medical staff of the Royal Air Force.

335. *Documentation*.—When casualties are evacuated by air they should be accompanied by the same medical documents as on land.

A note of any treatment given at any C.A.E.S. or during flight, must always be entered on the medical documents.

In addition, A.F. W 3083 (Casualty Evacuation Label) will be used (para. 397).

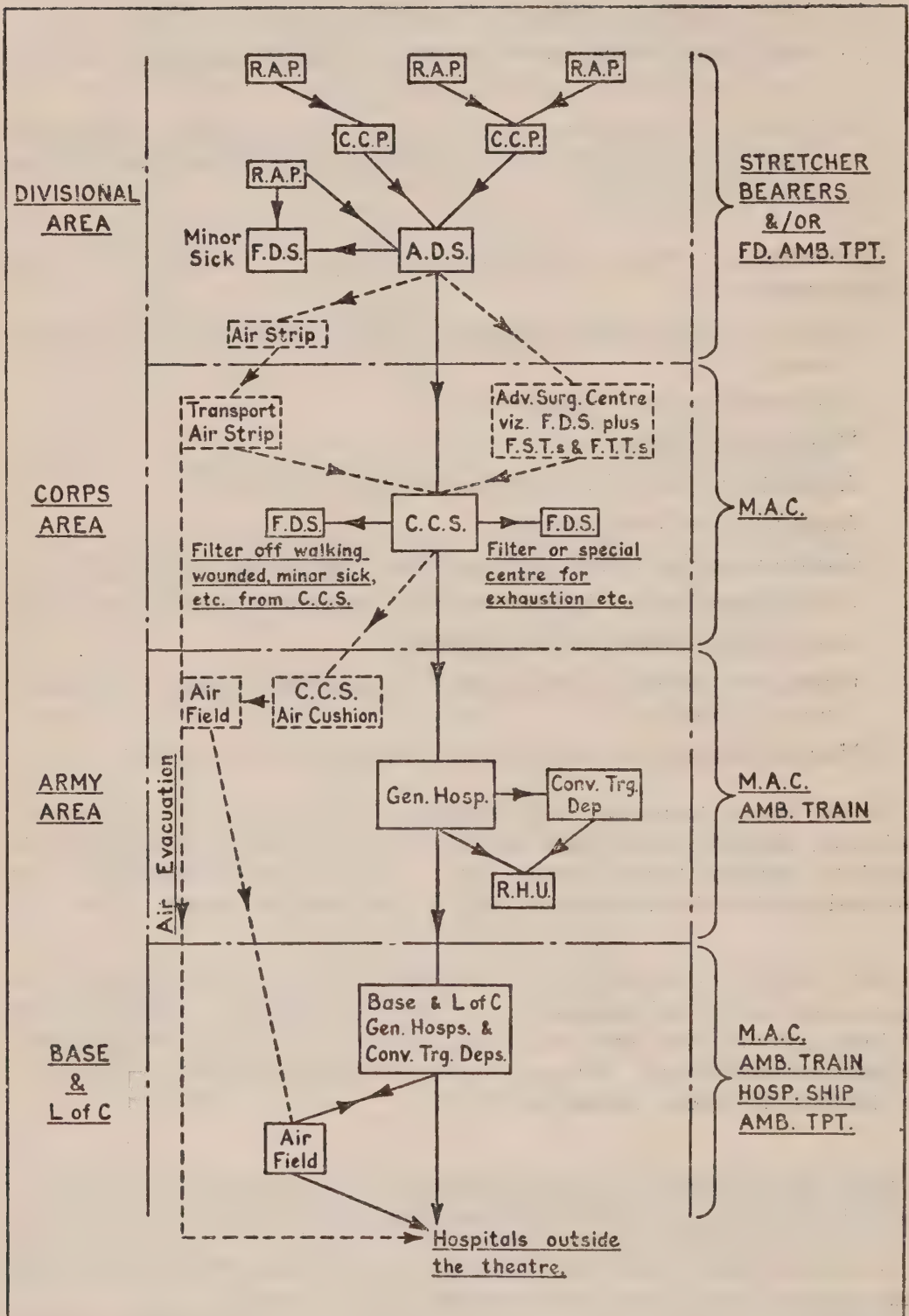


FIG. 3.—MEDICAL SERVICES EVACUATION OF CASUALTIES.

CHAPTER 8

TACTICAL EMPLOYMENT OF FORWARD MEDICAL UNITS

The Division

336. The A.D.M.S. should be located at main divisional headquarters where he can keep in close touch with the commander and the staff and be informed of actual events and future plans. He attends divisional operation group conferences. The A.D.M.S. should pay periodic visits to all divisional units, particularly field ambulances. When the A.D.M.S. is absent from divisional headquarters, the D.A.D.M.S. must remain as his representative to receive and dispatch messages and to keep in touch with the staff. The D.A.D.M.S. should therefore be located with the A.D.M.S. at main divisional headquarters.

337. Before an engagement, the A.D.M.S. will first obtain information as to the nature and scope of the operation, the object, the numbers of troops engaged, and the estimate of casualties. Having obtained this information, he will consider whether the resources at his disposal are sufficient or whether he must ask for them to be augmented. He will then make his plan and submit it to the A.Q. of the division for approval. The A.D.M.S. then holds a conference with the commanders of the medical units in the division and the M.A.C. representative at which he explains his plan, and allots a task to each unit involved; the plan should include the sites of the A.D.Ss. in the initial stages of the attack. The A.D.M.S. will usually follow up his conference by the issue of a medical operation instruction (para. 101).

338. The A.D.M.S. should arrange for a reserve of stretchers, blankets, dressings and splints; this reserve will normally be held in the divisional field dressing station, with forward dumps at each A.D.S.

339. During active operations, the A.D.M.S. will visit the advance dressing stations frequently to ensure that evacuation is proceeding satisfactorily. He will be prepared to reinforce a medical unit if required, and will discuss with the field ambulance commander any projected move of the A.D.S.

The Field Ambulance

340. Field ambulances are divisional troops, and as such their disposition is controlled by the A.D.M.S. acting under the authority of the divisional commander.

341. One field ambulance is usually allotted in support of each infantry brigade and then becomes an element of the brigade group, in which case, it conforms to the movements of the brigade, and collects the casualties occurring on the brigade front.

342. The siting, opening and closing of the A.D.Ss. are controlled by the A.D.M.S. but except in the initial stages of a planned battle, he frequently delegates his authority to the field ambulance commander, in which case the latter will inform the A.D.M.S. in advance of any intention to move and at once report the new location to the A.D.M.S.

343. In certain operations, a field ambulance is placed under command as distinct from in support of a brigade, *e.g.*, when the brigade is acting independently or in the early stages of an airborne operation; in this event the field ambulance commander with the concurrence of the brigade commander, will site and open the A.D.S.; he should where possible intimate his intention in advance to the A.D.M.S. and invariably report its location.

344. An A.D.S. may be opened for each brigade in action, or the A.D.M.S. may decide to open one A.D.S. (or possibly two) for the divisional front.

345. The field ambulance commander attends brigade operation conferences and maintains contact with brigade headquarters throughout the operation in order to obtain up-to-date information which will enable him to arrange for the speedy evacuation of casualties.

346. Paras. 347 to 358 set out some of the broad principles governing the deployment of the field ambulance. They are intended only as a guide. Dispositions must, of necessity, vary not only with the type of operations undertaken, *e.g.*, the attack, withdrawal, assault landing, etc., but also with the type of terrain, *e.g.*, European, jungle, desert, arctic, mountain, etc., and with local tactical and ground considerations.

347. In all types of operations, the field ambulance must be deployed in such a manner as to ensure the most efficient discharge of its role. (*See Chapter 5*).

348. The guiding principles in the evacuation of casualties are :—

- (a) The maximum speed consistent with efficiency must be achieved. To avoid delay, treatment should be reduced to the minimum necessary and directed towards controlling shock and haemorrhage, relieving pain and rendering the patient fit for evacuation.
- (b) The handling of the patient must be reduced to the essential minimum, *i.e.*, minimal transfers between ambulance cars, minimal change of dressing, etc.

349. *Field Ambulance Section*—The task of field ambulance sections is to collect casualties from the R.A.Ps. The section has

staff and equipment to form a casualty collecting post (C.C.P.) A casualty collecting post is usually located at the nearest point to an R.A.P. or R.A.Ps. attainable by ambulance cars. The C.C.P. is essentially a car post, but may in emergency act as a dressing station in addition.

350. When the advanced dressing station is within a short distance of R.A.Ps. and when road and tactical considerations allow ambulance cars to evacuate from the R.A.Ps., the establishment of a C.C.P. is unnecessary and should be avoided.

351. A section may establish a casualty collecting post to evacuate from one or more R.A.Ps. On many occasions two or more sections may conveniently form a combined casualty collecting post to evacuate from a brigade front.

352. *The Company Headquarters*—The company H.Q., administers the field ambulance company and its sections. The company commander is responsible for evacuation from R.A.Ps. to the advanced dressing station. A company is usually allotted the task of evacuation from an infantry or armoured brigade, and it is the duty of the company commander to maintain close liaison with the brigade headquarters staff.

353. *The field ambulance headquarters*—Headquarters forms an advanced dressing station, the role of which is fully described in Chapter 5. In siting an advanced dressing station full consideration should be given to the time factor involved in the evacuation of casualties through and out of the divisional area.

354. *The H.Q. Section*—The normal role of this section is to reinforce the advanced dressing station, but it may be required at any time to reinforce or relieve a section of the company. It is the field ambulance commander's reserve.

355. *Deployment in attack*—The advanced dressing station is located as far forward as possible before the beginning of the attack, to avoid the necessity of moving it during battle. Once established, it will not normally move until the battle situation is stabilized. Ambulance cars of the motor ambulance company R.A.S.C. should be attached to the advanced dressing station before the beginning of the attack.

356. One squad of bearers from the field ambulance section and an ambulance jeep or ambulance car are usually attached in support of each R.A.P. at the start of the action. Initial evacuation is usually from the R.A.P. direct to the advanced dressing station, but, as the troops advance, a casualty collecting post to act mainly as a car post will be established by the field ambulance section. The siting of this post is the responsibility of the field ambulance commander, but he often delegates it to the company commander.

357. If the attack develops into a break-through, sections must continue to move forward by bounds in rear of the R.A.Ps. The advanced dressing station will be prepared to move forward to a new position, to be decided by the field ambulance commander in consultation with the A.D.M.S. or the brigade commander. A rear party and car post must remain at the original site until it is cleared.

358. *Deployment in withdrawal*—Control, in the withdrawal, must be vested in the commander on the spot; field ambulances should normally be placed under command of brigades. It is essential in this type of operation, that nothing should be done which will interfere with the speed of withdrawal. First aid must, therefore, be restricted to the essential life-saving minimum. The aim must be to replace dressing stations, as far as possible, by car posts with the minimum of first aid personnel and vehicles. Heavy vehicles and equipment should be moved back beforehand to the limit of the withdrawal for any particular stage. An advanced dressing station should be opened only to the extent necessary to document casualties and render them fit for further evacuation to the casualty clearing station.

359. If large numbers of casualties have to be left behind, the senior medical officer on the spot will decide on the number of officers and men of the R.A.M.C. who should remain with the casualties. This number should be the minimum to ensure adequate treatment for the casualties and will rarely exceed one officer and five men for each 100 casualties. Rations, medical comforts, etc., should be left with the casualties in sufficient quantities to tide over the period between abandonment and capture by the enemy. Before deliberately deciding to leave officers and men behind to attend to casualties, the senior medical officer will, if possible, consult the formation commander and inform him of his intention. Particulars of such personnel who fall into enemy hands will be carefully noted and forwarded to 2nd echelon at the first opportunity.

360. The foregoing paras. deal with the employment of the field ambulance in an infantry division. The principles remain the same, whatever the type of formation, operation or terrain; the application of these principles will, however, vary in accordance with the local situation.

361. In warfare in undeveloped country, or in arctic or tropic regions, modification of personal or unit equipment, and in methods of transportation of casualties will be necessary to meet the needs of the particular situation. In such circumstances, the use of transport aircraft, both rotary wing and fixed wing type, will almost certainly be found necessary for casualty evacuation.

The Armoured Division

362. An armoured division when employed in its normal role of leading an advance or a pursuit may move rapidly over distances up to 40–50 miles a day. Normally the number of casualties sustained by an armoured division in such a role is small compared with those suffered by an infantry division.

363. The A.D.M.S. has to ensure at all times that a dressing station is open on the divisional centre line to which casualties from C.C.Ps. may be evacuated. This he does by keeping control of the headquarters (A.D.Ss.) of both the field ambulances while the companies of the field ambulances are placed under brigade control.

364. The O.C. each field ambulance (S.M.O. brigade) is centred on brigade headquarters during operations, with the task of clearing casualties with the company section from the brigade front, to the open A.D.S. He is thus in constant touch with brigade headquarters, and in possession of the latest information.

365. The A.D.M.S. “leap-frogs” the A.D.Ss. up the divisional centre line opening them at stages where he considers they will best serve the needs of the division.

366. In an advance or in a pursuit, in the initial stages, the order of march would be—

- (a) Sections of the companies of field ambulances in support of regiments/battalions.
- (b) The company headquarters moving with respective brigade headquarters group.
- (c) The leading field ambulance less its company moving on the divisional centre line, under command of brigade for movement and prepared to open an A.D.S. as and when required.
- (d) The second field ambulance (less company under command of brigade) under command of the A.D.M.S. and moving with the divisional H.Q., group.

367. Once the headquarters (A.D.S.) of the leading field ambulance has been opened under orders either of the O.C. field ambulance or the A.D.M.S., it reverts to the control of the A.D.M.S. and thereafter, the A.D.M.S. controls the opening, closing and movement of both A.D.Ss. until the conclusion of the operation.

The Airborne Division

368. The airborne field ambulance is deployed in the same way as the field ambulance in an infantry division when an airborne division is employed in a ground role.

369. On an airborne operation the following special considerations affect deployment :—

- (a) The field ambulance forms part of a parachute brigade group and remains under command of the brigade commander until such time as the A.D.M.S. of the division is able to assume effective control on the ground.
- (b) All essential equipment must be broken down into man loads (special packs for this are provided in the A.F. G 1098) and key personnel must be widely distributed throughout different aircraft.
- (c) There is no preliminary reconnaissance of the ground, but detailed reports of the area together with photographs are studied, and scale models prepared.
- (d) Initially there is no L. of C. so that wounded have to be held first at the R.A.Ps. and subsequently at the A.D.S. until the arrival of the follow-up ground troops.
- (e) There are invariably casualties on the dropping zone (D.Z.) and R.A.M.C. personnel may be dropped wide. This may seriously affect any pre-conceived plan of deployment.

370. The parachute field ambulance is usually deployed as follows :—

(a) *The Air Party*

This comprises the majority of the unit and the two attached field surgical teams. Most of the personnel drop by parachute, but a few, including the R.A.S.C. drivers, proceed by glider together with the light vehicles (jeeps, trailers and motor cycles) and the heavy equipment.

The parachute element is broken down as follows : one section is placed under command of each parachute battalion ; the remainder of the unit and the surgical teams fly in with brigade headquarters.

Once the brigade commander has decided upon the area he will hold, he orders the field ambulance headquarters to open an advanced dressing station and a surgical centre. This is usually close to brigade headquarters and inside the perimeter of one of the battalions in order to lessen defence responsibilities.

Once communications are established with the battalion R.A.Ps., some of the section personnel are recalled to assist in the advanced dressing station and surgical centre until the ground troops arrive and casualties can be evacuated. The S.M.O. brigade group is responsible for the medical administrative arrangements on all D.Zs. in the brigade area.

(b) Sea or Land tail

This consists of all the transport (except those jeeps and trailers and cycles taken in by air) and the remainder of the medical and ordnance equipment to enable the unit to operate fully in a ground role.

Divisional Field Dressing Station

371. The field dressing station in a division (paras. 155 to 158) is normally sited in the rear divisional area. It always remains under divisional control; it moves under orders of the A.D.M.S. In non-combat periods its role is to take care of minor sick in the division; in battle, in addition, it is generally employed to treat cases of exhaustion. It is usual in a move for one section to remain behind until it disposes of its cases before rejoining the headquarters of the unit at its new site.

Corps Medical Units

372. The disposition of the medical units in a corps is given in Chapter 6, in which the formation of an advanced surgical centre and of a corps medical centre is discussed in detail.

Assault Landings

373. In a sea-borne operation, there must be complete co-ordination between the services in medical as in other arrangements. The responsibility of each service in medical matters in the landing is outlined below, but the ideal is for each service to be ready and able to carry out as much of the others duties as possible in an emergency.

374. (a) The Navy is responsible for—

- (i) the care of all casualties occurring at sea, or in transit between beaches and casualty carrying ships, craft or barges with the exception of the casualties in amphibians or in water ambulances of hospital ships or carriers;
- (ii) the care of casualties embarked in landing ships or craft which have been specially adapted to carry casualties.

(b) The Army is responsible for—

- (i) the collection and evacuation of all casualties on land across the beaches and loading them into landing ships, craft and barges;
- (ii) the loading and transporting of casualties in amphibians;
- (iii) the care of all casualties on land and in vessels staffed by the army medical services,

(c) The Air Force is responsible for—

(i) loading casualties into aircraft used for casualty evacuation ;

(ii) The care of casualties emplaned.

375. Once assaulting troops are put ashore, a beach organization is necessary to maintain the assault and build-up troops. This organization must operate until such time as a port or ports can be captured and repaired sufficiently to enable maintenance and casualty evacuation across the beaches to be dispensed with.

376. The unit of beach organization is the beach group. A beach group has no permanent allotment to a particular assaulting formation since its establishment is designed to give it a capacity for handling a certain tonnage across beaches. This capacity and the " elbow-room " it requires is such that it would normally land on the frontage, and under the command of an assaulting infantry brigade.

377. Included in each beach group is a beach medical unit, consisting of three medical officers, three non-medical officers and 69 other ranks, with a small number of vehicles including three amphibians.

This unit is designed to provide one or more beach dressing stations (B.D.S.) and a casualty embarkation point (C.E.P.). There are no personnel in this unit for the collection of wounded. This is done by pioneers or infantry of the beach group, trained beforehand in this task and in rendering first aid.

378. A beach brigade consists of two beach groups together with brigade troops. A beach brigade has no permanent allotment to an assaulting formation, but normally lands on the frontage of and under the command of an assault division. A beach brigade is allotted two field dressing stations (F.D.S.) each of which is supplemented by not less than two field surgical teams and one field transfusion team.

379. An A.D.M.S. is borne on the strength of H.Q. beach brigade. His duties are :—

(a) To advise the beach brigade commander on all medical matters within the beach brigade, including the training of the medical units.

(b) To maintain close liaison with the Naval Officer Build Up (N.O.B.U.) in order to effect the medical evacuation plan. For this purpose it is usual to attach a naval medical liaison officer to assist in co-ordinating the loading and dispatch of casualties off shore.

(c) To co-ordinate the work of the medical units and R.M.Os. in the beach brigade.

If the beach brigade is placed under command of the assault division for landing, the A.D.M.S. assault division will issue directives on technical matters to the A.D.M.S. beach brigade.

380. The assault formations have their normal allotment of field ambulances, *viz*: one to each brigade, which is placed under command of the brigade for landing. The normal disposition of the field ambulance is that one section is allotted to each battalion and lands with its battalion, with which it maintains contact throughout the operation. The headquarters of the field ambulance lands with the assault brigade headquarters and opens an advanced dressing station at a site and a time provisionally agreed on beforehand, but subject to the local and tactical situation. It should in any case be well clear of the beach.

381. The beach medical unit is built up gradually, a few medical personnel being included in the first of the beach development parties who normally land about 30 minutes after the initial assault; the remainder of the unit should be ashore within a further 30 minutes to set up one or more beach dressing stations to deal with all casualties on the beach. The casualty evacuation point will be established later at approximately one hour before the time when ships or craft are made available for the reception of casualties.

382. Two field dressing stations are landed with the added component of field surgical teams and field transfusion teams; they should be landed in time to establish an advanced surgical centre not later than four hours after the initial assault. The provisional site will have been determined in the first key plan; the actual site will depend on the situation ashore; normally it will be about a mile inland in the beach maintenance area.

383. A planning guide for the landing of medical personnel and medical units in relation to "H" hour (*i.e.*, the time when the first assault craft strikes the beach) is:—

H plus 30 minutes:—assault battalions ashore accompanied by R.M.Os. and one section of assault field ambulance to each assault battalion.

H plus 60 minutes:—beach development parties ashore, including elements of beach medical units to open beach dressing stations.

H plus 90 minutes:—beach dressing stations fully open.

H plus 120 minutes:—H.Q. of assault field ambulance ashore with A.D.S. open inland from beaches at approximate level of assault brigade H.Q.

H plus 240 minutes:—field dressing stations together with surgical and transfusion teams ashore; advanced surgical centre open approximately one mile inland; C.E.P. open.

Second Tide :—first casualty clearing station ashore.

It may be difficult to attain these timings; they will be possible only if the various detachments of the various medical units are bid into the landing tables at the proper stage.

384. *Casualty Procedure.*—The medical units of the assault division should be committed as little as possible on the beaches: casualties occurring on the beaches are primarily the responsibility of the beach medical unit, which forms beach dressing stations for this purpose.

The first medical personnel ashore are the regimental medical establishments of the assaulting battalions, each supported by the attached section of the assault field ambulance. The latter will hold casualties pending the arrival of the beach dressing stations. Next to arrive is the headquarters of the assault field ambulance, which opens an advanced dressing station as the situation develops inland. The advanced dressing station and the beach dressing stations hold casualties until the arrival of the advanced surgical centre, whereupon cases unfit for evacuation are sent there for retention and treatment, the remainder being sent, after initial treatment, to the casualty embarkation point for transfer to casualty carrying ships.

When the first C.C.S. arrives, it takes the strain off the advanced surgical centre by opening up in an adjacent site. A second C.C.S. should arrive on the second day, followed later by more C.C.Ss., a M.A.C. and a General Hospital.

Air evacuation will be available as soon as an airfield is captured or improvised. Casualty evacuation over the beaches will continue until such time as it can be replaced wholly or in part by air evacuation or until a port is opened.

385. *Evacuation Policy.*—Casualties occurring in first flight landing craft will return in the craft to the ship from which the next serial is to be collected, and will be taken on board for treatment.

Casualties occurring in all subsequent flights will be landed and treated ashore and subsequently evacuated.

During the assault phase all casualties will be evacuated after initial treatment except those whose injuries are so severe that they are unfit to travel. Such cases will be retained in the advanced surgical centre or casualty clearing station until they are fit for evacuation.

After the assault phase, the number of casualties to be evacuated will depend on the holding policy (paras. 90 and 91). This will be stated in the plan of the force commander.

386. The evacuation of casualties from beaches to casualty carrying ships is discussed in Chapter 7. The best plan is for a

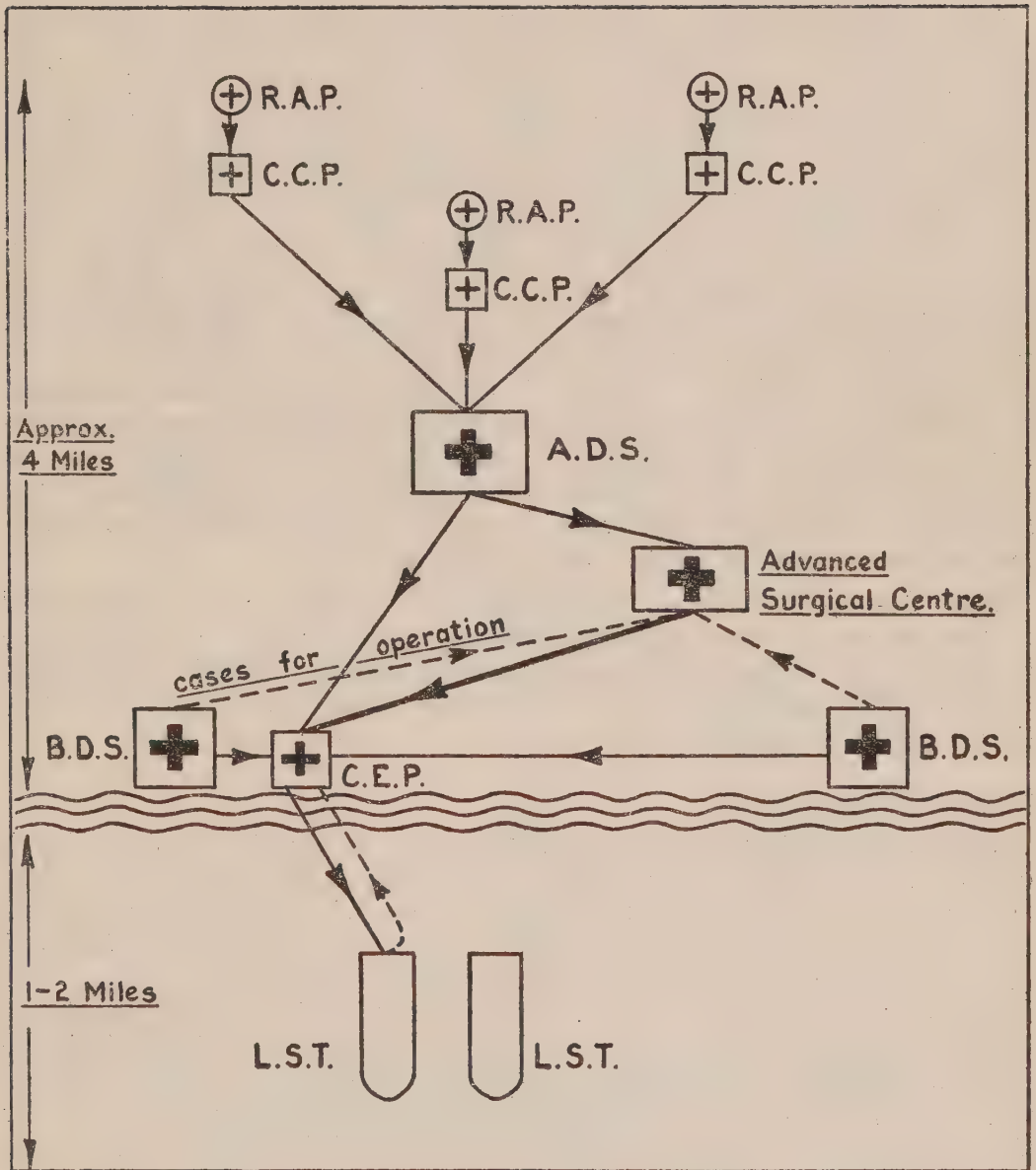


FIG. 4.—MEDICAL LAYOUT IN A DIVISIONAL ASSAULT LANDING ON ONE BRIGADE FRONT. H+4 HRS.

number of amphibians to be allotted in the assault plan specifically for this purpose. If the numbers available do not permit this course, it will be necessary to detail individual amphibians or minor landing craft from time to time to clear the casualties collected at the casualty embarkation point.

387. Medical units in the assault land at light scale; like other units they will not get their transport vehicles for some hours after they land. It is therefore necessary to provide pioneers for hand carriage of casualties on the beach and also for the personnel of medical units to carry ashore sufficient medical stores to enable the unit to function until their main stores arrive in their vehicles. It is particularly important to land a reserve of stretchers and blankets at an early stage; these should be preloaded along with reserve medical stores in the amphibians generally allotted for medical evacuation (normally one platoon to an assault division). Subsequent replenishment of medical stores is by the provision of maintenance medical "blocks" in the ordnance beach depot, to which some R.A.M.C. personnel are attached to assist in distribution; this system continues until the first advanced depot of medical stores is landed. Ordnance continue to be responsible for the replenishment of stretchers and blankets, large quantities of which are required to make up for initial wastage.

388. Special training, "wet shod" and "dry shod" is essential to the success of the medical plan in assault landings. In the case of drivers of medical vehicles this should include practice in driving their vehicles on and off ships and craft, and in waterproofing and de-waterproofing them.

River Crossings

389. In assaulting across a *wide* river it is usual to form a bank control group on the lines of the beach group in a seaborne operation, to assist the assault formations. In order to free the medical units of the assault division from responsibility for the disposal of casualties in the assembly and marshalling areas on the near bank of the river, it is customary to attach a medical unit to bank control group for this purpose. This unit may be a field ambulance from a division not engaged or may be a corps or army medical unit. It is also usual to provide amphibians (paras. 317-321) for the transport of casualties across the river. The method is for the assault division to form C.C.Ps. on the far bank, from which amphibians ferry casualties back to casualty disembarkation points on the near bank, where the medical unit detailed for bank control off-load them into ambulance cars for transfer to the A.D.Ss. of the holding division or direct to C.C.Ss. in the corps medical centre. This procedure continues until a secure lodgement is obtained on the far bank, where the A.D.Ss. of the assault division are opened and the river is bridged.

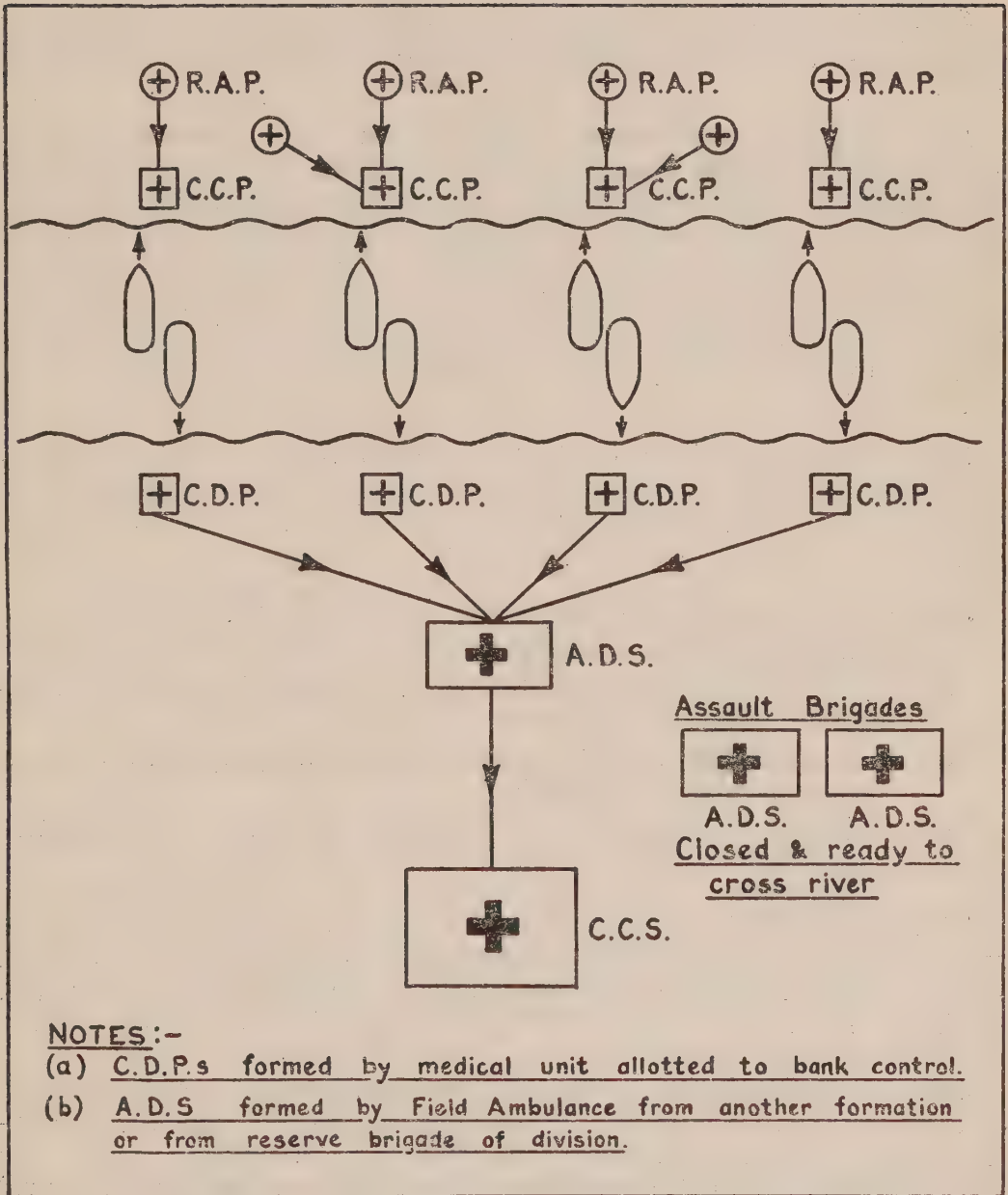


FIG. 5.—MEDICAL LAYOUT IN A DIVISIONAL RIVER CROSSING ON A TWO BRIGADE FRONT.

CHAPTER 9

DOCUMENTATION OF CASUALTIES
IN THE FIELD

390. An accurate regimental and clinical record of casualties is a definite responsibility of all medical units through which casualties pass.

391. This record consists of the number, rank, name and unit, and diagnosis of the casualty. It is required so that the next-of-kin can be informed of the casualty as speedily as possible. General headquarters 2nd echelon are charged with this duty and to carry it out they depend on the nominal rolls of casualties received from medical units. These nominal rolls are an extract from the Admission and Discharge Book (A.B. 27A) kept by all medical units and are forwarded daily to G.H.Q. 2nd Echelon, by every medical unit in the force.

392. A record of the clinical condition and the treatment of casualties in their progress through medical units is necessary so that each succeeding medical unit can adopt the optimum treatment.

393. Other reasons for accurate documentation are :—

- (a) to assist units in the preparation of their casualty returns;
- (b) to provide information for O2E, for the despatch of reinforcements;
- (c) to provide statistical records of the campaign from which lessons may be learned;
- (d) to assist subsequently in disposing of claims for disability pension.

394. The first place in the line of evacuation where a permanent record of the casualty can be undertaken is the advanced dressing station formed by the headquarters of the field ambulance (or, in the case of an assault landing, at the casualty evacuation point).

395. Documentation must not delay treatment or evacuation of the casualty. To ensure against delay an adequate documentation drill must be perfected and practised during training. In forward medical units, especially in times of stress, there is a natural tendency to imperfect documentation in order to evacuate casualties as soon as first aid is completed. But by good organization first aid and documentation can proceed simultaneously without causing delay in disposal. This has been proved even on the beaches in assault landings, and no excuse can be entertained for any medical unit being unable to furnish an accurate nominal roll of all casualties

that have passed through it, and their diagnoses. In forward units, however, the clinical notes may be reduced to a bare statement of the diagnosis together with a record of administration of morphia and application of tourniquet, where applicable.

396. For each patient A.F.W 3210 ("Label for Patient"—revised print) will be prepared in duplicate by the reception clerk at the first medical unit receiving the casualty.

The original A.F. W 3210 will be passed to the A and D clerk who will enter the casualty's personal particulars and diagnosis in the A and D book, A.B. 27A. The duplicate copy will be placed by the reception clerk in the field medical envelope, A.F. W 3118A, attached to the casualty.

The N.C.O. in charge of the evacuation section must ensure that when a case is evacuated he notes the serial No. of the A.F. W 3210 and subsequently informs the A. and D. clerk who then shows the case as evacuated in the A. and D. book.

On arrival at a medical unit in the rear the duplicate A.F. W 3210 will be removed from the field medical envelope by the reception clerk and handed to the A. and D. clerk for entering in the A. and D. book as before. It will then be returned to the N.C.O. in charge of evacuation section who will restore it to the envelope when the casualty leaves the unit. This procedure will be repeated at each medical unit through which the casualty passes; this method saves a great deal of time in clerking.

The A. and D. clerk should arrange the A.Fs. W 3210 by units, thus enabling the recording of casualties, by units, to be easily arranged.

397. When cases are evacuated by air or sea A.F. W 3083 (Casualty Evacuation Label) will be used. This is a tie-on label made out in triplicate detachable sheets. One copy will be detached on emplaning or embarking, one copy on disemplaning or disembarking, the third copy will accompany the patient to the receiving hospital, where the name and location of the hospital will be entered.

A complete record of the disposal of the casualty is thus available in the event of any enquiries or in the event of an aircraft or ship failing to reach its destination.

398. *Description of wound*—The diagnosis should state the causal agent of the wound and the part of the body injured, *e.g.*, G.S.W. Rt. Arm ; Bomb wound Lt. Foot.

The causal agents :—

- (a) Wounds caused by small arm ammunition are recorded as G.S.W. When the nature of the weapon is known, *e.g.*, rifle, pistol or machine-gun (M.G.) it should be added in brackets.

- (b) Wounds caused by shells and mortars are recorded as Shell Wound. When the nature of the weapon is known, *e.g.*, Artillery or mortar, it should be added in brackets, *i.e.*, Arty or Mortar.
- (c) Wounds caused by bombs or grenades are recorded as Bomb Wound. When the nature of the weapon is known, *e.g.*, aerial, grenade, it should be added in brackets.
- (d) Wounds caused by mines are recorded as Mine Wound. The nature of the mine when known should be added.
- (e) Wounds resulting from burns are recorded as Burns. The cause of the burns when known should be added in brackets, *e.g.*, petrol, flash, flame thrower, phosphorus.
- (f) Injuries caused by blast are recorded to indicate the source of blast, *e.g.*, concussion (bomb blast), fracture of foot (mine blast).
- (g) Chemical warfare injuries are recorded as C.W. and if known the nature of the gas indicated, *e.g.*, C.W. mustard.

399. All casualties belong to one or other of the following types and should be so described :—

Battle Casualty	—	(abbreviation = B.C.)
Battle Accident	—	(„ = B.A.)
Accident	—	(„ = A.)
Sick	—	(„ = S.)

Definitions of these types are given in the Pamphlet: Unit Documentation and Casualty Procedure (1950).

Where possible a note should be made indicating any special circumstances in which the casualty occurred, *e.g.*, wounded or injured when parachuting, etc.

400. *Self-Inflicted wounds*—If there is any suspicion or evidence that the injury is self-inflicted, such information must be dispatched under separate cover to the medical unit to which the casualty is evacuated. Such cases should be retained in the medical unit until the matter is cleared up by regimental inquiry.

Records to be kept and returns to be rendered

FIELD AMBULANCES AND FIELD DRESSING STATIONS—RECORDS AND RETURNS.

401. (a) *Records*

- (i) A.F. W3118 (Field Medical Card) and A.F. W3118A (tie-on envelope for A.F. W3118) if not already initiated before admission, will be completed for every patient admitted or received as a transfer in a field ambulance or field dressing station. As

it is important to standardize the entries in the interest of uniformity the following abbreviations will be adopted :—

$\frac{M\frac{1}{4}}{1800}$ = Morphia gr. $\frac{1}{4}$ given 1800 hours

$\frac{T}{1820}$ = Tourniquet applied at 1820 hours

$\frac{ATS}{1000}$ = Anti-Tetanic Serum 1,000 units.

All entries must be dated.

- (ii) Particulars of every case admitted or received as a transfer will be entered in the A. and D. Book (A.B. 27A).

Field surgical teams and field transfusion teams attached to field dressing stations or to casualty clearing stations will maintain A.B. 485 "Operation Books" or "Transfusion Books" as the case may be. The parent unit will maintain the A. and D. Book.

(b) *Reports and returns*

- (i) All deaths occurring will be reported by telegram to O2E at once with confirmation by post the same day.
- (ii) An extract from the A. and D. Book (A.B. 27A) will be forwarded *daily* by quickest means to O2E showing all entries for that day.

CASUALTY CLEARING STATIONS—RECORDS AND RETURNS

402. (a) *Records*

These will be maintained as for a field ambulance. A.Bs. 485 Operation or Transfusion Book will also be maintained.

(b) *Reports and returns*

In addition to those required from a field ambulance, the army number, rank, name and unit of officers and other ranks who are placed on the "Dangerously Ill" or "Seriously Ill" list together with the nature and degree of the disability will be telegraphed to G.H.Q. 2nd Echelon.

Particulars of change of condition, *i.e.*, removal from the "Dangerously Ill" or "Seriously Ill" lists or transfer from one to the other, will be similarly telegraphed.

Weekly states of personnel on "Dangerously Ill" and "Seriously Ill" lists will be rendered to G.H.Q. 2nd Echelon, on A.F. W3034A.

GENERAL HOSPITALS—RECORDS AND RETURNS

403. (a) *Records*

These will be maintained as for a C.C.S. except that A.F. I 1220 (hospital record or sick list card) will be initiated for every patient admitted or transferred to a general hospital replacing A.F. W 3118 which will, however, accompany the patient's documents.

When general hospitals are functioning as enlarged C.C.Ss., *i.e.*, receiving and transferring large numbers of casualties each day, the administrative medical officer concerned may direct that entries will continue to be made on A.F. W 3118 and that A.F. I 1220 need not be prepared.

(b) *Reports and returns*

These are identical with those required from a casualty clearing station.

Note: In general hospitals it is convenient to keep separate A. and D. Books (A.B. 27A) for:—

- (a) Officers, including female officers.
- (b) Other ranks, including females.
- (c) Royal Navy.
- (d) Royal Air Force.
- (e) Each Dominion Force.
- (f) Each Colonial Force.
- (g) Enrolled civilian personnel.
- (h) Native Labour Corps.

404. Medical documents A.F. W 3118 and A.F. I 1220, will accompany the casualty until he is finally disposed of by return to duty or by invaliding or by death, whereupon they will be dispatched by the last medical unit in which treatment was carried out to War Office, A.M.D. (Stats).

OTHER RETURNS.

405. In addition to the above records, and returns dealing with casualties, each medical unit will render in respect of its unit personnel (including attached personnel) such unit returns as may be common to all units in the force, *see* Pamphlet—Unit Documentation and Casualty Procedure (1950).*

* *To be published.*

CHAPTER 10

ROYAL ARMY DENTAL CORPS IN THE FIELD**Administration**

406. The Royal Army Dental Corps is an integral part of the Army Medical Services and is administered by the Deputy Director of Dental Service (D.D.D.S.) on behalf of the Director of Medical Services of the Force, to whom he is directly responsible.

407. Administrative dental officers are also borne on the strength of H.Q. army and certain L. of C. formations.

These officers are responsible, through the senior administrative medical officers of their formations, to the Deputy Director of Dental Service of the force for the efficiency of the dental service within the areas of their administration.

Allotment of dental officers

408. The ratio of dental personnel to troops allotted in a field force is one dental officer, one dental operating room assistant and one dental technician for 2,000 men.

409. Dental officers are attached to the following field medical units for employment; the officer commanding the unit will provide facilities for the dental officer's work :—

- Field Ambulances
- Casualty Clearing Stations
- General Hospitals
- Convalescent Depots
- Hospital Ships.

Dental officers are also employed in :—

- Maxillo Facial Surgical Teams
- Mobile Dental Teams
- Field Dental Centres
- Field Dental Laboratories

Duties of dental officers in the field

410. The principal duties of dental officers in the field are :—

- (a) The prevention of dental sick wastage by prompt treatment.
- (b) Co-operation with the surgical specialist in the treatment of fractures of the jaws, maxillo-facial injuries, and other surgical conditions of dental origin and with the medical specialist in cases of systemic diseases likely to be affected by the dental condition.
- (c) General assistance, in emergency, to other branches of the medical services, *e.g.*, administration of anaesthetics, resuscitation, etc. Dental duties will, however, except in emergency, take precedence over all other duties.

Field Ambulance

411. A dental officer is attached to each field ambulance and normally works at the headquarters of the unit. During active operations, he will render early treatment to maxillo-facial casualties (See Memorandum on the Preliminary Treatment of Maxillo-Facial Injuries for Medical and Dental officers in Forward Battle Areas, 1947) and will assist generally in the work of the field ambulance.

When active operations are not in progress, he will be responsible for the comprehensive dental treatment, including the provision and repair of dentures of the troops in the area in which the field ambulance is located.

Casualty Clearing Station

412. A dental officer is included in the establishment of each casualty clearing station. During active operations, the dental officer will give such further treatment as is considered necessary to cases of maxillo-facial injury received from the forward medical units, bearing in mind that such cases should be evacuated as early as possible for treatment by the nearest maxillo-facial surgical team. Treatment will therefore be confined to ensuring the well-being and comfort of the patient during his onward journey. As in the case of officers attached to field ambulances he will assist generally in the work of the casualty clearing station.

When active operations are not in progress, he will be responsible for the comprehensive dental treatment including the provision and repair of dentures of all troops in the area in which the casualty clearing station is located.

General hospital

413. A dental officer is included in the establishment of each general hospital of 100 beds or over; in the case of a hospital with 300 beds or over, he is a specialist. The dental officer, in conjunction with the surgical specialist, will be responsible for the treatment of fractures of the jaw and other surgical cases of dental origin. (Cases of maxillo-facial injury should be transferred as soon as possible to a general hospital to which a maxillo-facial surgical team is attached). He will co-operate with the medical specialist in cases of systemic diseases affected by the dental condition. In addition he is responsible for the dental treatment of all hospital patients and such troops in the area in which the hospital is located as his other duties will permit.

Convalescent Training Depot

414. Two dental officers are attached to each convalescent training depot. They will ensure that all patients are made dentally fit before they are discharged. Special attention will be given to the provision, repair and renewal of dentures where necessary.

Hospital Ship (*Hospital Ship*)

415. The dental officer attached to a hospital ship will treat any maxillo-facial casualties throughout the voyage and will be responsible for the dental treatment of all patients and the medical staff of the ship.

Maxillo-facial Surgical Team (*Maxillo-facial Detachment*)

416. The establishment of this specialized team includes two dental officers, two dental technicians and two dental operating room assistants.

These teams are usually attached to certain general hospitals. The two officers on the establishment of this unit are specialist maxillo-facial dental surgeons, and will maintain close liaison with the specialists in surgery.

Mobile Dental Team

417. A mobile dental team consists of a dental officer, a dental technician, a dental operating room attendant and a R.A.S.C. driver for the unit vehicle. These teams are allotted on the basis of :—

- 1 per armoured division.
- 2 per infantry division.
- 3 per corps.

Plus an increment of one for every division or its equivalent within each corps. They are allotted for operational purposes to Deputy Director of Medical Services Army and are normally detached to lower formations. They are not self-accounting and must therefore be attached to a unit for maintenance and administration. They are capable of undertaking comprehensive dental treatment including denture work.

Field Dental Centre (F.D.C.) (*Dental Operating Detachment*)

418. Dental centres are established in L. of C. and base areas according to the distribution of troops; they vary in establishment from one to four officers (Class A to Class D). Dental technicians are not provided on their establishment. As they are not self-accounting, field dental centres are attached to a unit for maintenance and administration.

Field Dental Laboratory (*Dental Prosthetic Detachments (Fixed)*)

419. One field dental laboratory, consisting of one officer and eight dental technicians, is established to undertake denture work for several field dental centres.

As they are not self-accounting, field dental laboratories are attached to other units for maintenance and administration.

CHAPTER 11

MEDICAL ADMINISTRATIVE PROBLEMS ARISING FROM THE DEVELOPMENT OF ATOMIC, BIOLOGICAL AND CHEMICAL WARFARE

PART I—ATOMIC WARFARE

General

420. It is probable that the bombing of industrial areas and large centres of population will form an integral part of warfare in the future and that the Army will be implicated by the part they will be called upon to play in assisting civil defence. Modern weapons such as the atomic bomb, make possible the levelling of large urban areas in one single bombardment. Any such attack will, of course, result in casualties which by their numbers alone, quite apart from any other considerations of degree and kind, will involve the medical services to a degree not hitherto encountered.

Casualty figures

421. So far, two atomic bombs have been dropped over enemy targets. An average for the casualties produced in these two instances, namely, at Hiroshima and Nagasaki, given by the official report of the British Mission to Japan, is approximately 65,000 killed and a similar number injured for each bomb.

The number of killed and wounded depends upon the state of preparedness, the density of population, the configuration of the ground, the type of building structure and other factors such as the site of bomb explosion. In a western city, the figures given above are likely to be very materially reduced, but the casualties will infinitely transcend those resulting from ordinary bombing, *e.g.*, one atomic bomb may cause casualties ranging from 5,000 killed and 5,000 injured to 30,000 killed and 30,000 injured.

422. *The site of detonation* of the bomb plays a very important part in the amount and type of destruction and in the number of casualties to be anticipated. An atomic bomb may be exploded in the air, on the ground, or under water, and these different types of burst each present a somewhat different problem:—

(a) Air Burst

If this occurs at the optimum height above ground, the effect of the blast is rather more widespread than in the other methods. There is a tremendous release of radiation, and many cases of radiation illness will result. Flash burns in unprotected personnel are numerous.

(b) Ground Burst

The effect of blast is decreased somewhat by shielding afforded by the buildings in the immediate vicinity and the effective range of radiation will also be reduced for the same reason. However, there may be considerable radio-active contamination around the point of burst.

(c) Underwater Burst

This results in a tremendous amount of water containing radio-active materials being blown into the air, which, on falling creates a surge of mist (the base surge) itself radio-active, which in its turn contaminates the area over which it spreads.

423. Assuming that detonation occurs with the present type of bomb at such a height as to produce maximum blast damage and casualties, the following result may be anticipated :—

(a) Within half mile

Almost complete destruction. Fatalities will approximate 100 per cent. This area may be written off as a total loss and disregarded as requiring immediate attention except from spreading fires. Deaths result from blast, heat and radiation effects.

(b) Half to one-and-a-half miles radius

Almost all but reinforced concrete structures will be badly damaged ; numerous fires will be started. Fatality casualties in this region may reach 50 per cent. and few people will escape without some injury and/or radiation effects. This is the area, with the addition of an additional mile, *i.e.*, half to two-and-a-half miles from centre for which immediate medical care will be most urgently needed. This is the area also from which the greatest need would arise for the provision of blood and blood products.

(c) Three to four miles radius

Damage will be negligible but some personnel may be struck by flying fragments and suffer superficial injury.

Types of casualties

424. The types of casualties naturally include those that one would expect to find in any area of blast, resulting in flying fragments and collapsing buildings. But there are two types of casualties that are more or less peculiar to atomic warfare—these are flash burns and radiation effects. There has been a tendency to magnify the effects of radiation, serious as they are, at the expense of other types of casualties. Figures from Japan show that of all types of injuries sustained, 85 per cent. consisted of trauma and burns, whereas radiation deaths comprised 15 per cent.

The types of casualties can be summarized into those resulting from :—

- (a) Trauma.
- (b) Burns.
- (c) Effects of radiation.
- (d) Effect on morale.

425. These different types of casualty are now described briefly :—

(a) *Trauma*

Either by blast or indirect trauma due to falling or flying debris. An atomic bomb explosion differs from an ordinary bomb in that the blast has a wider range.

Types of trauma have been indicated as—

Fractures — 11.5 per cent.

Contusions — 53.8 per cent.

Lacerations — 34.7 per cent.

The incidence of mechanical injury at between half to one-and-a-half miles is about 60 per cent. The number of such injuries decreases rapidly outside the three mile radius though in Japan some windows were broken as far away as twelve miles from the centre of the explosion.

(b) *Burns*

These may be classified as flash burns and thermal burns. Flash burns occur at the precise time of atomic explosion and are peculiar to atomic explosion. They are caused by infra-red rays and ultra-violet rays of very high intensity but acting over a short period of time. The range of flash burning is up to 4,000 yards. In an unwarned and unprotected populace, flash burns would produce very numerous casualties; but they are easily prevented if forewarned. It was found that loose fitting, light coloured clothing offered considerable protection to the wearers, as the light colours reflected the rays whereas darker colours absorbed them. Although the range of flash burning is considerable, few of those occurring at a distance of over 3,000 yards will require treatment. Some protection for face and hands will be necessary at closer range if any warning is given.

Ordinary thermal burns will be common among survivors as the number of fires started will be high.

The effective treatment of burns constitutes a medical problem of considerable magnitude. The demand for whole blood and plasma (or substitutes) will be very great. The bed space occupied and the time spent in dressing burns calls for research into new methods of treatment.

(c) *Effects of radiation*

Radiation sickness resulting either from radiation released at the time of explosion or from radio-active contamination of the ground is the second type of casualty peculiar to the atomic bomb. The actual biological cause is not known. It is characterized by nausea and vomiting, fever, diarrhoea, shock, loss of blood, destruction of marrow, loss of hair, bleeding tendencies, etc. The cases may be of all degrees from very mild to fatal ; the onset of symptoms may occur almost at once or may be delayed for weeks. In treatment there is a great demand for whole blood and plasma.

The types of radiation encountered may come from the bomb burst or from residual contamination. The bomb emits gamma rays and neutrons. Neutrons, although dangerous, do not travel beyond the zone of destruction by blast but the gamma radiation has a greater range and will also penetrate considerable thicknesses of steel or concrete. Protection from radiation close to the centre of the explosion is therefore very difficult, if not impossible, without very deep shelter facilities.

(d) *Morale effect*

In spite of the serious consequences of atomic explosion, troops must be educated to understand that such an occurrence is not by any means the end for all concerned. There are very definite limits to the ill-effects both of blast and radiation. A compromise between healthy respect for the power by the bomb and yet lack of unreasoning fear of the unknown, must be effected by instruction and demonstration.

426. In preparing shelters against atomic bombardment, the penetrating radiation and the terrific blast effect must be kept in mind. The best type of shelter possible would be underground, and sufficiently deep to screen out all significant radiation. Shelters of this type are not feasible for entire urban areas. Next to underground shelters, low built windowless reinforced concrete structures are the most adequate.

427. As much of the danger from radio activity may be from skin and clothing contamination and the inhalation of radio active dusts, individuals engaged in fire fighting should wear disposable clothing. Careful bathing as soon after exposure to contamination as possible should be enforced. Dust masks give protection against radio-active dusts and should be available where the dust content of the air is high.

Radiological Defence

428. Because of the radiological hazards which may be created by atomic attack, the military commander and his medical adviser will be confronted with many new and difficult problems in conserving man-power and maintaining morale. To meet these problems new methods are being devised. To this activity the term "radiological defence" is applied. By this term is meant measures of a defensive nature intended to minimize the anti-personnel effects which may result from injurious exposure of personnel to the radiation hazards which may arise.

429. The technical aspects of radiological defence are concerned with methods for detecting and measuring ionising radiation and in the application of information so obtained in the evaluation of the military significance of such radiological risks.

430. The detection and measurement of radiation for the defence of a force in the field will usually be carried out by non-medical personnel who are trained to do this type of technical work, by means of monitors. But the medical officer will have specific responsibilities in addition to his other duties in advising the commander in the medical aspects of radiological safety. In addition, medical units will have the responsibility of all units in the Army in maintaining certain unit personnel trained in the radiological defence measures. Personnel training in monitoring for radiation as well as adequate monitoring equipment are essential to radiological defence. There is also a responsibility in determining the fitness for consumption of food and water, following possible radio-active contamination.

Collection of casualties

431. One plan is to establish a number of collecting stations on the edge of the bombed area. Such stations would be established in houses, schools or any other available shelter. Casualties would be given first aid treatment, labelled and then evacuated to outlying hospitals, equipped to deal with a specific type of case. It is important that each collecting station should be provided with detection instruments and personnel trained in their use, to monitor clothes and patients for radio-active contamination. Monitoring of the area itself is essential to ensure that rescue squads are not being subjected for unduly long periods to excessive doses of radiation.

432. The number of casualties is likely to be so great that the medical services will have a problem of the greatest magnitude in their collection, accommodation and treatment.

PART II—BIOLOGICAL WARFARE

433. Biological warfare may be defined as the use of bacteria, fungi, viruses, rickettsias, and toxic agents derived from living organisms (as distinguished from synthetic chemicals used as gases in chemical warfare) to produce death or disease in men, animals and plants. It has never been employed in actual warfare, except in crude forms just falling within the definition (*e.g.*, poisoning of wells, etc.) ; consequently the scope and effect of modern possibilities in this field of warfare cannot be judged until biological warfare has been used on a large scale in actual war.

434. Although the possibility of the use of biological agents against animals or crops should not be discounted, here we are concerned only with its use against human beings. It is clear that the causative agents of a number of diseases might be artificially dispersed in order to cause casualties in the armed or civilian populations ; a study of some of these potential biological agents indicates that a wide range of effects, ranging from almost certain death in a comparatively short period to lingering illnesses of a non-fatal character, might be possible by a suitable choice of agent. In common with natural infections, there will be a period between actual infection and the appearance of symptoms ; this period will vary from days to weeks according to the agent used.

Possible targets and methods of disposal of biological agents

435. Biological agents might be disseminated by saboteur methods or on a larger scale by missiles from bombing aircraft, etc. In the first case, water supplies and foodstuffs are likely to be the target of choice; in the latter, attempts might be made to infect a large number of people in, for example, a city by disseminating the agents in the form of an airborne cloud. In this case, biological warfare will generally be used for strategic aims, *i.e.*, in an attack on a country's industrial potential and civilian morale, although concentrations of troops and base areas would also be potential targets. The use of biological warfare against armies in a tactical role, though just possible, is unlikely ; apart from the danger to the attackers' own forces in close contact, the effect would not be sufficiently rapid to have an immediate effect on the course of a battle.

Means of infection

436. In general, infection by biological agents is possible through the mouth, nose, eyes or through the skin, though the relative danger from each would vary from agent to agent. Probably direct entry *via* the respiratory or digestive system is likely to constitute the greater danger in the majority of possible diseases. In most cases bacteria do not remain viable for long periods after release, and the

danger of infection is therefore likely to decrease after a time. Some diseases, however, are caused by spore-forming organisms which are very much more resistant to exposure and may therefore remain a potential source of infection for months or even years. In considering agents dispersed into the air, the initial chance of infection will be high, but will lessen as the particles settle out and the initial high concentration is dispersed by air movement; this will in general apply to all organisms, whether of the short lived bacterial type or spores.

437. Apart from the danger from breathing in agents released into the air, there may be a danger of further infection after the cloud has settled, owing to the shake-up of bacteria, from clothing, hair, etc.

438. The possibility of the transmission of the diseases by infected individuals to others should be taken into account, but it seems unlikely in the present state of knowledge that biological agents could be deliberately used to start an epidemic, even if the attacker thought it desirable to do so. Nevertheless, the danger of epidemics developing naturally should not be discontinued. *Account*

Methods of Defence

439. (a) *Detection of the agent.*—There is a time lag between exposure and effect. Further, even in the case of well known organisms, several days may be required to identify the agent after detection. Early detection and speedy identifications are of importance in order to minimize casualties and to institute measures of protection. Intelligence can play a valuable part.

(b) *Physical Protection.*—Some measure of protection will result from simply remaining or proceeding indoors. Airborne organisms are not likely to invade intact premises or shelters in high concentration. A well-fitting respirator provides protection, but a danger of infection from clothing, hair, etc., remains after the respirator has been removed.

(c) *Food and Water Supplies.*—Main water supplies in towns will require careful filtration, chlorination and constant analysis in addition to protection from sabotage. Administrative instructions on the safe guarding of unit food supplies by covers, containers, bins and adequate cooking will also be necessary.

(d) *Decontamination and Disinfection* of personnel, clothing and equipment will be a requirement, both on a large scale for routine decontamination and on an individual scale, in order that those exposed to a biological attack may have

a relatively simple procedure which can be carried out before removal of respirators in order to minimize the danger of infection from clothing, etc.

- (e) *Immunization with vaccines*.—Vaccines are specific in their action, so their value would depend on the agent used. There is a time lag in attaining immunity; for this and other reasons, mass immunization may not be a practicable proposition.
- (f) *Prophylaxis and treatment* with antibiotics and chemotherapeutic agents may prove of great value in the case of certain agents.
- (g) *Maintenance of morale* by instruction in the limitations of biological warfare is of great importance.

PART III—CHEMICAL WARFARE

General

440. The gases most likely to be used in a war in the near future, arranged in order of their importance are the nerve gases, mustard and phosgene. Each has its own administrative problems and these may well be complicated by the simultaneous use of high explosive. The nerve gases and mustard are liquids at ordinary temperature, whereas phosgene is a gas.

441. All three are potentially lethal agents; nerve gases and mustard possess in addition very great harassing power. The mode of death differs widely between the three. Nerve gases kill quickly if in sufficient concentration, whereas death from mustard and phosgene is rarely immediate and takes place as a rule in hours, or more often, days after exposure. The ratio of deaths to casualties is high in the case of phosgene, low for the other two.

442. The service respirator protects the face, eyes and respiratory tract fully against all three, and protective clothing of the oilskin type gives limited protection against liquid nerve gases and mustard. Phosgene is only effective by inhalation, so that no protection other than a respirator is needed. *Given timely warning of their presence*, there is therefore no reason why trained troops should suffer casualties through inhalation, but, unless impregnated clothing is worn (together with the prophylactic use of ointment on the exposed parts of the body) it is not easy to avoid skin burns from mustard vapour, particularly in hot climates, or the effects of absorption of nerve gases.

443. Quite apart, however, from causing casualties, the nuisance value of gas warfare in impeding movement, diverting effort, disturbing rest, increasing physical strain and denying access to ground is very great, and for this reason it is possible that nerve gases and mustard will be used against forward troops.

Nerve gases

444. These are colourless and odourless liquids which give off non-irritant, invisible vapours possessing either a very faint odour or none at all.

445. They are absorbed into the body by all routes, from the lungs, through skin and all mucous surfaces; the liquid penetrates ordinary fabric. The rate of absorption is greater when exposure is to liquid than to vapour or aerosol, since vapours and aerosols are always diluted to a greater or less extent with air. Absorption is particularly rapid through the conjunctivæ and through breaches of skin surface.

446. Detection of nerve gases is by a chemical test which however does not act quickly enough to give adequate pre-warning of the presence of the gas, as the effects develop so rapidly. Consequently, in any bombardment, when in doubt, it will be necessary to wear the respirator.

447. The effects of nerve gases are upon function, not structure; they cause no local irritation and no gross damage to tissue. They interrupt the paths along which nervous control of the body by the brain is maintained and stimulate uncontrolled activity at the periphery by destroying cholinesterase, an enzyme which is vital to the orderly transmission of nervous impulses. Respiratory function is severely disorganised, and, if the amount absorbed is large enough, rapid death from anoxia follows unless energetic measures to combat this are taken. Although it is anticipated that the actual fatalities relative to the number exposed will be few, nevertheless all those exposed will be temporarily disabled (unless adequately protected) by the harassing effects described in para. 449.

448. The potent effect of nerve gases on morale must also be taken into account. Whereas the victims of poisoning with mustard or phosgene usually die out of sight in medical units some time afterwards, those absorbing a fatal quantity of nerve gas die in the field in full view of their comrades. This is liable to have a profound effect on others simultaneously exposed, although suffering from effects of less severity; further, in the initial stages of the use of these gases, widespread alarm may be caused by exaggerated accounts of their toxicity.

449. Although fairly heavy concentrations of vapour are needed to produce fatal effects, harassing actions of a disabling character follow comparatively brief exposure to low concentrations. These consist of headache, rhinorrhoea, nausea, difficulty in breathing, extreme miosis and spasm of accommodation, so that vision is markedly impaired, particularly at dusk, and focusing upon near

objects (*e.g.*, weapon sights), is intensely painful and difficult to the point of impossibility. Instillation of 1 per cent. atropine solution relieves these eye symptoms, but, in the absence of atropine, the effects will not pass off for two to three days.

450. Although there is no evidence that nerve gases are cumulative, nevertheless there is reason to suppose that individuals repeatedly exposed to small concentrations become sensitized and subject to attacks of spasmodic asthma from minimal doses. The problem of the disposal of such cases will not be an easy one, and it is probable that a number will have to be transferred out of the theatre of operations.

451. Provision of special protective equipment is unnecessary, since that issued for use against mustard is enough.

452. The hazard from vapour or aerosol is mainly by inhalation, for, although these will penetrate clothing and are absorbed by the skin, they are unlikely to be present in sufficient concentration to be dangerous by this route, except possibly in hot confined spaces. Absorption of vapour or aerosol through the conjunctivæ will, however, produce the harassing effects already described. It is only necessary to adjust the respirator to be fully protected against these.

453. Nerve gas in liquid form, however, is absorbed with great rapidity by the skin, and even greater rapidity by the eyes. Eye-shields to protect the eyes will be worn, and if the eyes, the bare skin, or even the clothing is splashed, a situation of great urgency is created. Liquid on the skin must be removed *immediately*, and the skin all round thoroughly washed clean. All splashed clothing must be stripped off at once and abandoned if life is to be saved, unless it is of a protective type, in which case a few minutes grace is allowed. In contamination with liquid nerve gas, speed is everything. Hence personal decontamination can only be done by the man himself.

454. Effective treatment of the early acute stage of severe nerve gas poisoning can only be carried out by trained personnel actually on the spot; time will not allow such casualties to be moved elsewhere for treatment. Equipment for doing this must be provided in an easily portable form.

455. In severe cases it may be necessary to force air into the lungs with a portable resuscitator of the hand bellow type and to administer a full dose of atropine, preferably intravenously. This combats the acute respiratory failure for the five or 10 minutes necessary until the casualty recovers sufficiently to be able to breathe unassisted.

456. Atropine (1/50 gr.) by intravenous injection should be given at once. If intravenous injection is impossible, atropine must be given intramuscularly into the buttock, through the clothing if need be, the risk of infection being accepted. It will therefore be necessary to train stretcher bearers or other first-aid personnel to give injections of this kind. The conditions are likely to be adverse, since the casualties will be fully clothed and equipped, and those giving first-aid will be wearing respirators and possibly protective clothing in addition.

457. Arrangements will be made in medical units to decontaminate the clothing of gas-contaminated casualties, but, in addition, decontamination facilities will be needed in all units to deal with personnel who are not casualties, and with all the problems of large scale decontamination. These will include arrangements for replacing the clothing and equipment which has become contaminated and stripped off, and for decontamination generally of equipment, vehicles, weapons, stretchers, etc. Atropine sulphate in the form of injections should also be made available in all units to counteract the harassing effects.

458. Cases of severe nerve gas poisoning, or where wounds, injuries or sickness exist in conjunction with nerve gas poisoning will be admitted to medical units in the ordinary way. All clothing and equipment should be removed since nerve gas vapour clings to clothing and will have harassing effects both on the wearer and those around who may be unprotected by respirators. Injection of atropine may have to be repeated, sedation will be needed, and means of giving artificial respiration should be near at hand, in case there is a recurrence of respiratory failure. It is probable that most of those who reach a medical unit will recover, though severe symptoms may continue for 48 hours.

459. Evacuation to a centre where cholinesterase estimations can be done, will be necessary before the final disposal of such cases can be decided. It is undesirable to re-expose a cholinesterase-depleted individual to nerve gas, and its complete regeneration takes several weeks. It is likely that a good deal of psychological trauma will be found among these casualties.

Mustard

460. The properties and effects of mustard are well known ; they may be summarized as follows : Mustard is a faintly-smelling poisonous liquid, giving off vapour which is also poisonous ; both penetrate clothing. Both cause local trauma (blistering) and general systemic effects, the severity depending on the concentration and the length of exposure ; the eyes are particularly affected. These effects do not appear at once, but after the lapse

of some hours. Absorption is not so rapid as with nerve gases, hence there is a good chance of aborting its action by prompt decontamination ; once however it has been absorbed, there is no specific treatment.

461. Provision of full-scale decontamination facilities in medical units will be needed, with arrangements for disposing of contaminated clothing and equipment, decontamination of the body surface, re-clothing and treatment of associated wounds and injuries.

The decontamination of unwounded personnel is not a medical responsibility.

Phosgene

462. The poisonous effects of phosgene are solely on the respiratory tract ; they are brought about by inhalation and no decontamination is possible. It has great irritant properties, leading to oedema of the lungs and, if much has been inhaled, to death from anoxia. These effects are likely to be delayed for some hours, but individuals exposed to the gas must not be allowed to exert themselves meanwhile. The provision of facilities in medical units for administration of oxygen simultaneously to a number of patients is necessary. This is most easily done by a gas-pipe bringing oxygen from cylinders outside along the length of the ward, with a tap at each bed and a B.L.B. mask joined to it by rubber tubing.

ALLOTMENT OF MEDICAL UNITS TO A FORCE

	Divisional Troops			Corps Troops	Army Troops					G.H.Q., Troops
	Airborne Div.	Arm'd. Div.	Inf. Div.		Two Ind. Arm'd. Bdes.	Airborne Div.	Arm'd. Div.	Inf. Div.	Corps	Army
1. Fd. Amb. ..	3	2	3	—	1(a)	—	—	—	—	1
2. F.D.S. ..	1	1	1	2	—	—	—	—	1	1
3. Fd. Hyg. Sec. ..	—	—	—	1	—	—	—	—	—	1
4. Fd. Hyg. Coy. ..	—	—	—	—	—	—	—	—	—	1
5. Fd. Med. Coy. ..	—	—	—	—	—	—	—	—	3	1
6. C.C.S. ..	—	—	—	—	—	—	—	—	1	1
7. Adv. Dep. Med. Store ..	—	—	—	—	—	—	—	—	—	1
8. Conv. Trg. Dep. ..	—	—	—	—	—	—	—	—	—	1
9. F.S.T.	6(b)	—	—	—	—	6(b)	2	2	—	—
10. Fd. Transfusion Team (FTT) ..	9	—	—	—	—	—	—	—	3	2
11. Neuro. Surg. Team ..	—	—	—	—	—	—	—	—	—	1
12. Maxillo-Facial Surgical Team ..	—	—	—	—	—	—	—	—	—	1
13. Ear, Nose and Throat Team ..	—	—	—	—	—	—	—	—	1	—
14. Ophthalmic Team ..	—	—	—	—	—	—	—	—	1	—
15. Special Treatment Team ..	—	—	—	—	—	—	—	—	—	—
16. Chest Sur. Team ..	—	—	—	—	—	—	—	—	—	—
17. Burns Team ..	—	—	—	—	—	—	—	—	—	—
18. Mob. Dental Team ..	—	—	—	—	—	—	1	2	3	—
19. Mob. Bact. Lab. ..	—	—	—	—	—	—	—	—	—	—
20. Mob. Hyg. Lab. ..	—	—	—	—	—	—	—	—	—	—

One per base area or sub-area.

As required to provide overall cover of 1 per cent.

As required.

As required.

One per div. or equivalent.

One per Corps.

One per Army.

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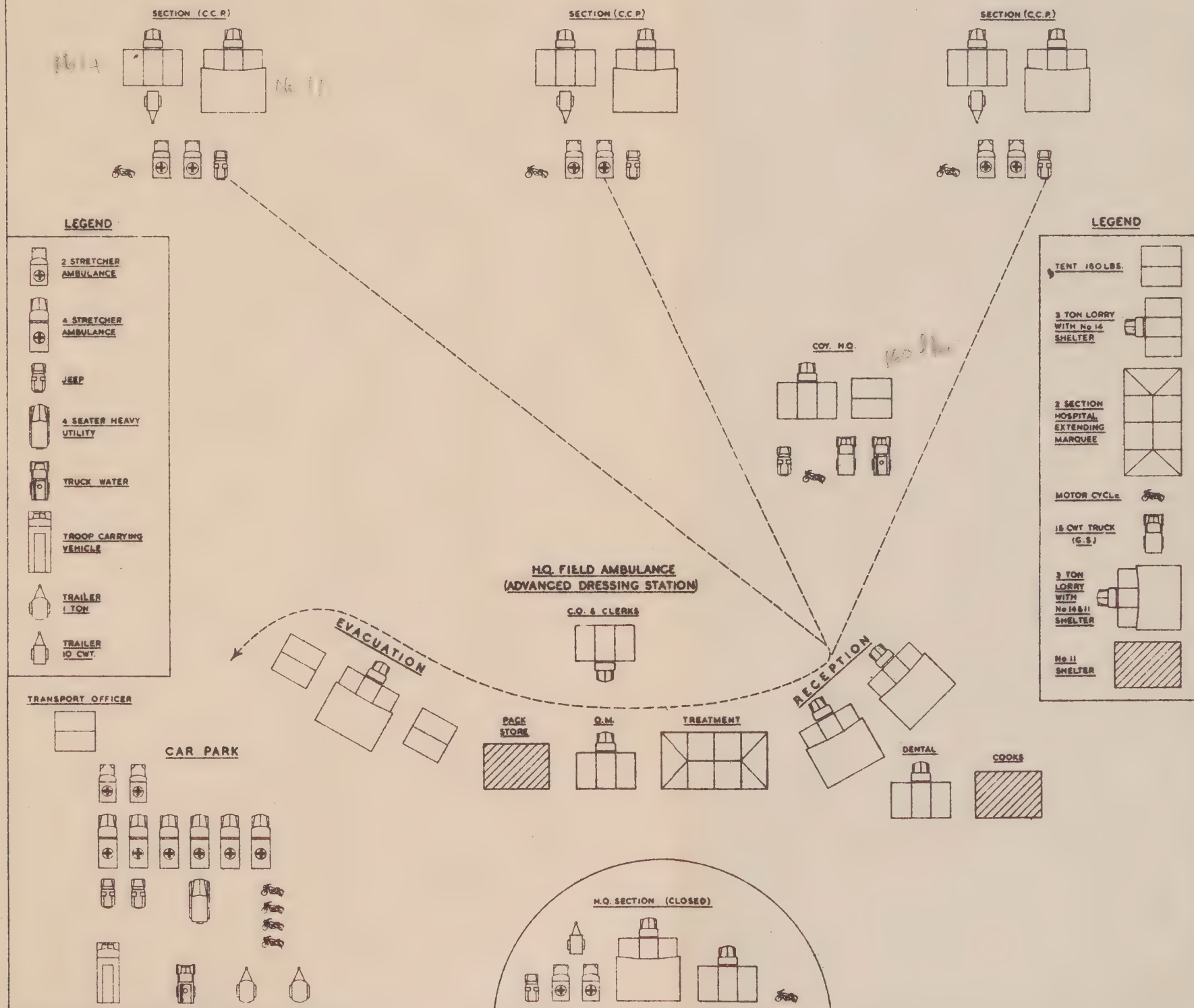
STAFF TABLE—MEDICAL

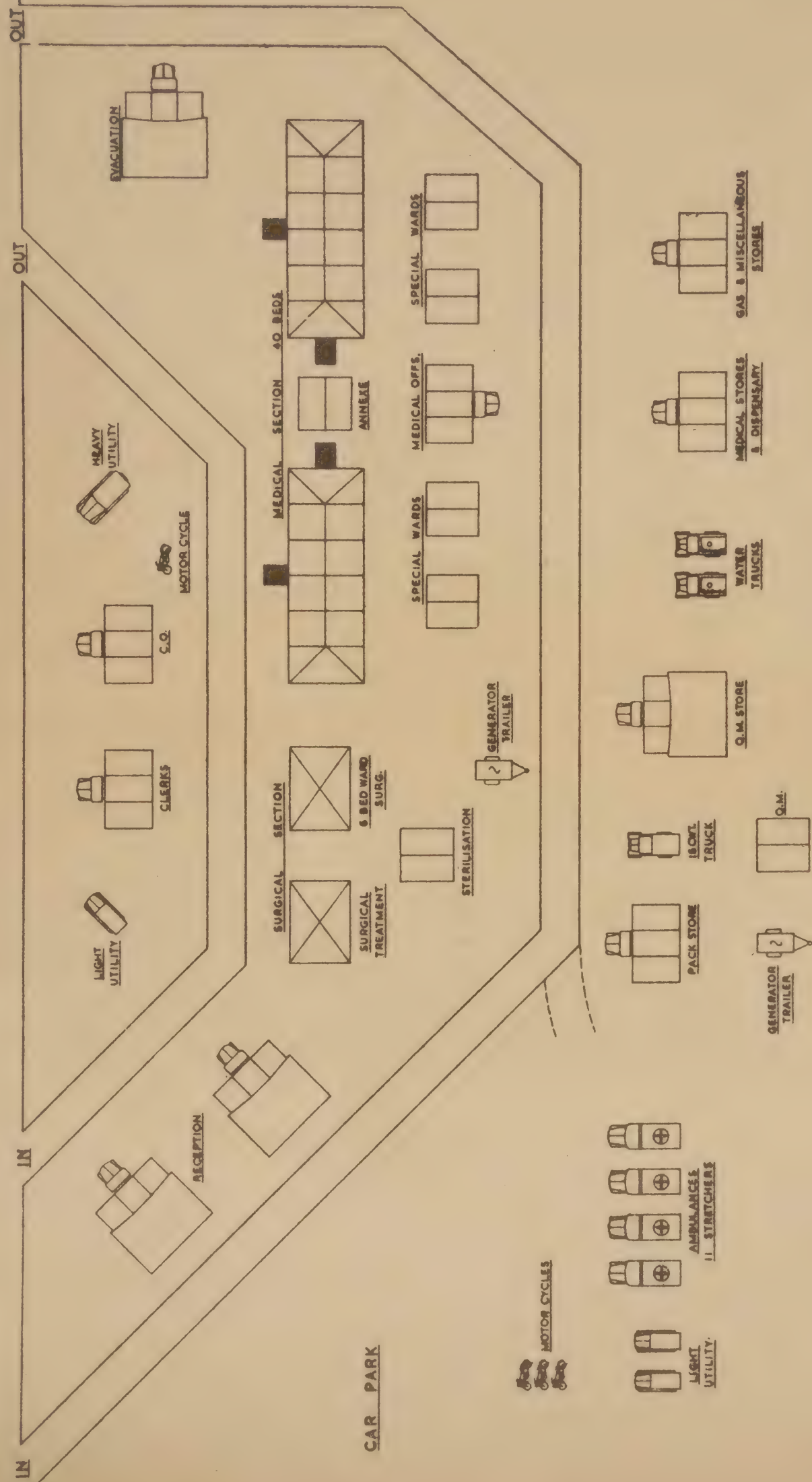
APPENDIX 2

UNIT	W.E. No.	Officers	Other Ranks	Q.A.R.A.N.C.	Motor Cycles	Cars, utility	Jeeps	M.Amb.—4 str.	M.Amb.—2 str.	Trucks, 15 cwt. G.S.	Trucks, water, 15-cwt.	Lorries, 3-ton	Amphibians, various	Total vehicles	Trailers, 10-cwt.	Trailers, 1-ton	A.F.G.1098 No.	Dead weight, tons	Shipping tonnage, tons	A.F.I. 1248 No.	Dead weight, tons	Shipping tonnage tons	Total weights of Comb. G1098 and I.1248	
																							Dead weight tons	Shipping tonnage tons
Advanced Depot of Medical Stores	III/51/4	1	16	—	—	—	—	—	—	1	1	3	—	5	—	—	3814/1	4	15	6	31	97	35	112
Airborne Field Ambulance ..	I/852/1	13	221	—	9	1	7	6	10	3	2	16	—	54	4	2	3733/1	6	20	23	3½	8½	9½	28½
Ambulance Train (Type A) ..	IV/123/2	2	34	2	—	—	—	—	—	—	—	—	—	—	—	—	769/1	8½	25	8	3½	3	9	28
Base Depot of Medical Stores ..	IV/349/1	3	52	—	—	—	—	—	—	1	—	1	—	2	—	—	5235/1	13	42	5	192	580	205	622
Base Malaria Field Laboratory ..	IV/256/2	5	16	—	—	—	2	—	—	2	—	—	—	4	2	—	3825/1	½	2	13	½	1½	1	3½
Base Transfusion Unit ..	IV/220/1	4	69	—	2	2	—	—	—	3	—	11	—	18	—	—	3815/1	2	6	16	11	16	13	22
Beach Medical Unit ..	III/489/1	6	69	—	—	—	5	—	2	1	—	—	1	9	5	—	5369/1	—	—	32	—	—	—	—
Burns Team ..	IV/352/1	3	4	2	—	—	—	—	—	—	—	—	—	—	—	—	3876/1	3	7	37	1	3	4	10
Casualty Clearing Station ..	III/460/2	16	131	22	1	1	—	1	—	2	1	3	—	9	—	3	5036/1	35	120	3	4	12½	39	132
Central Depot of Medical Stores ..	IV/349/1	4	69	—	—	—	—	—	—	1	—	1	—	2	—	—	Based on B.D.M.S.	—	—	—	—	—	—	—
Central Path. Lab. ..	IV/353/1	1	10	—	—	—	—	—	—	—	—	—	—	—	—	—	3823/1	½	2	40	¾	1½	1½	3½
Convalescent Training Depot (1,000 men)	IV/351/1	12	107	—	—	1	—	—	—	1	2	2	—	6	—	—	3826/1	48	185	24	¾	1½	48½	186½
Field Ambulance ..	II/905/1	13	221	—	9	1	7	6	10	3	2	16	—	54	4	2	5042/1	10	35	4B	1½	4½	11½	39½
Field Dental Centre, Class A ..	IV/240/1	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	5321/1	2 cwt.	18cuft.	28	3 cwt.	14 cuft	½	4/5
Field Dental Centre, Class B ..	IV/240/1	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	5321/1	3	20	28	5	25	2/5	1½
Field Dental Centre, Class C ..	IV/240/1	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	5321/1	5	30	28	7	35	3/5	1½
Field Dental Centre, Class D ..	IV/240/1	4	4	—	—	—	—	—	—	—	—	—	—	—	—	—	5321/1	6	1 ton	28	9	1½	¾	2½
Field Dental Laboratory ..	IV/239/1	1	11	—	1	—	—	—	—	1	—	—	—	2	—	—	5273/1	1	3½	28	1½	4½	2½	7½
Field Dressing Station ..	II/433/2	7	115	—	4	3	1	4	—	1	2	10	—	25	—	2	3734/1	4	14	20	1	2½	5	16½
Field Hygiene Company ..	III/384/1	10	213	—	8	—	29	—	—	8	1	4	—	50	29	—	3735/1	24	84	No scale	1 cwt.	7 cuft	24	84½
Field Medical Company (H.Q.) ..	IV/359/1	12	50	—	2	9	—	2	—	1	—	4	—	18	—	—	3877/1	—	—	35	—	—	—	—
Field Hygiene Section ..	IV/161/2	1	34	—	3	—	6	—	—	1	—	1	—	11	6	1	5050/1	4	14	—	—	—	4	14
Field Surgical Team ..	III/168/2	2	8	—	—	—	1	—	—	—	—	1	—	2	—	1	5257/1	3	7	19	1	3½	4	10½
Field Transfusion Team ..	IV/440/1	1	3	—	—	—	—	—	—	—	—	1	—	1	—	—	5279/1	1½	3	17	1	2	2½	5
General Hospital (50 beds) ..	IV/356/1	4	36	5	—	—	—	—	—	1	—	—	—	1	—	—	Not yet scaled	10	35	1	4	12	14	47
General Hospital (200 beds) ..	IV/356/1	14	114	22	—	1	—	—	—	—	1	1	—	3	1	—	5035/1	42	132	1	9	30	51	162
General Hospital (600 beds) ..	IV/356/1	23	217	50	—	1	—	—	—	1	2	2	—	6	3	—	5069/1	120	480	1	14	50	134	530
General Hospital (1,200 beds) ..	IV/356/1	34	343	80	—	1	—	—	—	1	2	2	—	6	5	—	5068/1	250	800	1	21	73	271	873
Hospital Carriers ..	IV/438/1	3	31	6	—	—	—	—	—	—	—	—	—	—	—	—	3800/1	1	3	7	1½	5½	2½	8½
Hospital Ships (500 beds) ..	IV/47/5	6	63	14	—	—	—	—	—	—	—	—	—	—	—	—	5300/1	4	14	7	6½	12	10½	26
Malaria Control Company ..	IV/245/2	12	156	—	—	—	11	—	—	15	—	9	—	35	11	—	1130/1	14	40	No scale	—	—	14	40
Maxillo-Facial Surgical Team ..	IV/436/1	7	16	8	—	—	2	—	—	—	—	2	—	4	—	2	3521/1	½	2½	25	2½	9½	3	12
Medical Forward Treatment Unit	IV/279/2	19	187	13	—	—	—	—	—	5	—	—	—	5	—	1	5323/1	112	425	29	10½	34	122½	459
Medical Platoon for an Ambulance Launch Company R.A.S.C.	IV/406/1	—	79	—	—	—	—	—	—	—	—	—	—	—	—	—	Not yet scaled	—	—	NIL	—	—	—	—
Medical Platoon for a Motor Ambulance Company R.A.S.C.	III/176/1	—	34	—	—	—	—	—	—	—	—	—	—	—	—	—	5252/1	—	—	NIL	—	—	—	—
Mobile Bacteriological Laboratory	III/50/5	1	4	—	—	—	—	—	—	1	—	1	—	2	—	—	5047/2	½	2	9	¾	1½	1½	3½
Mobile Dental Team ..	III/182/1	1	3	—	—	—	—	—	—	—	—	1	—	1	—	—	5011/1	½	2	28	1½	2	1½	4
Mobile E.N.T. Team ..	III/382/1	1	5	—	—	—	—	—	—	—	—	1	—	1	—	—	3738/1	½	2	38	1 cwt.	½	½	2½
Mobile Hygiene Laboratory ..	III/50/5	1	4	—	—	—	—	—	—	1	—	1	—	2	—	—	5047/2	½	2	10	3 cwt.	1½	½	3½
Mobile Malaria Field Laboratory ..	III/325/2	4	17	—	—	1	—	—	—	3	—	1	—	5	—	—	5320/1	½	2	13	1	4½	1½	6½
Mobile Neuro-Surgical Team ..	III/306/2	6	11	6	—	—	2	—	—	—	—	2	—	4	—	—	3330/1	12	48	14	4	12½	16	60½
Mobile Ophthalmic Team ..	III/380/1	1	6	—	—	—	—	—	—	—	—	2	—	2	—	—	3737/1	1	3	39	½	1	1½	4
Port Detachment R.A.M.C. ..	IV/204/2	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	5278/1	½	¾	No scale	—	—	1½	¾
Psychiatric Hospital ..	IV/43A/3	24	163	42	—	1	—	—	—	1	1	2	—	5	—	—	990/1	120	480	30	14	50	134	530
Returned Store and Repair Section R.A.M.C.	IV/405/1	1	20	—	—	4	—	—	—	—	—	—	—	4	—	—	5356/1	—	—	NIL	—	—	—	—
Special Treatment Team ..	III/381/1	2	7	—	—	1	—	—	—	—	—	1	—	2	—	—	3736/1	½	2	36	½	1	¾	3
Surgical Team for Chest Surgery ..	IV/439/1	4	8	4	—	—	—	—	—	—	—	—	—	—	—	—	3824/1	½	2	27	½ cwt.	3½ cuft	½	2½

DIAGRAMMATIC LAYOUT OF A FIELD AMBULANCE

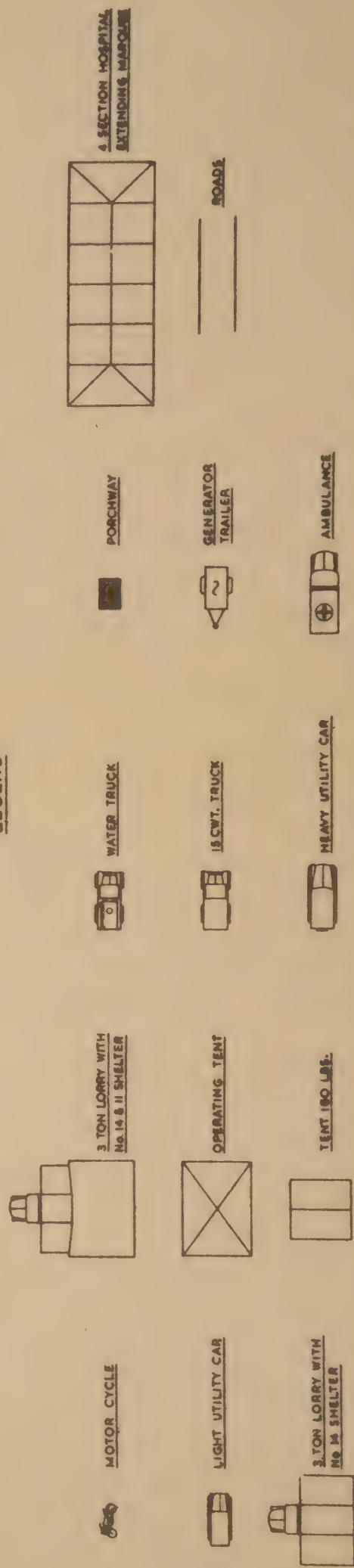
APPENDIX 3A

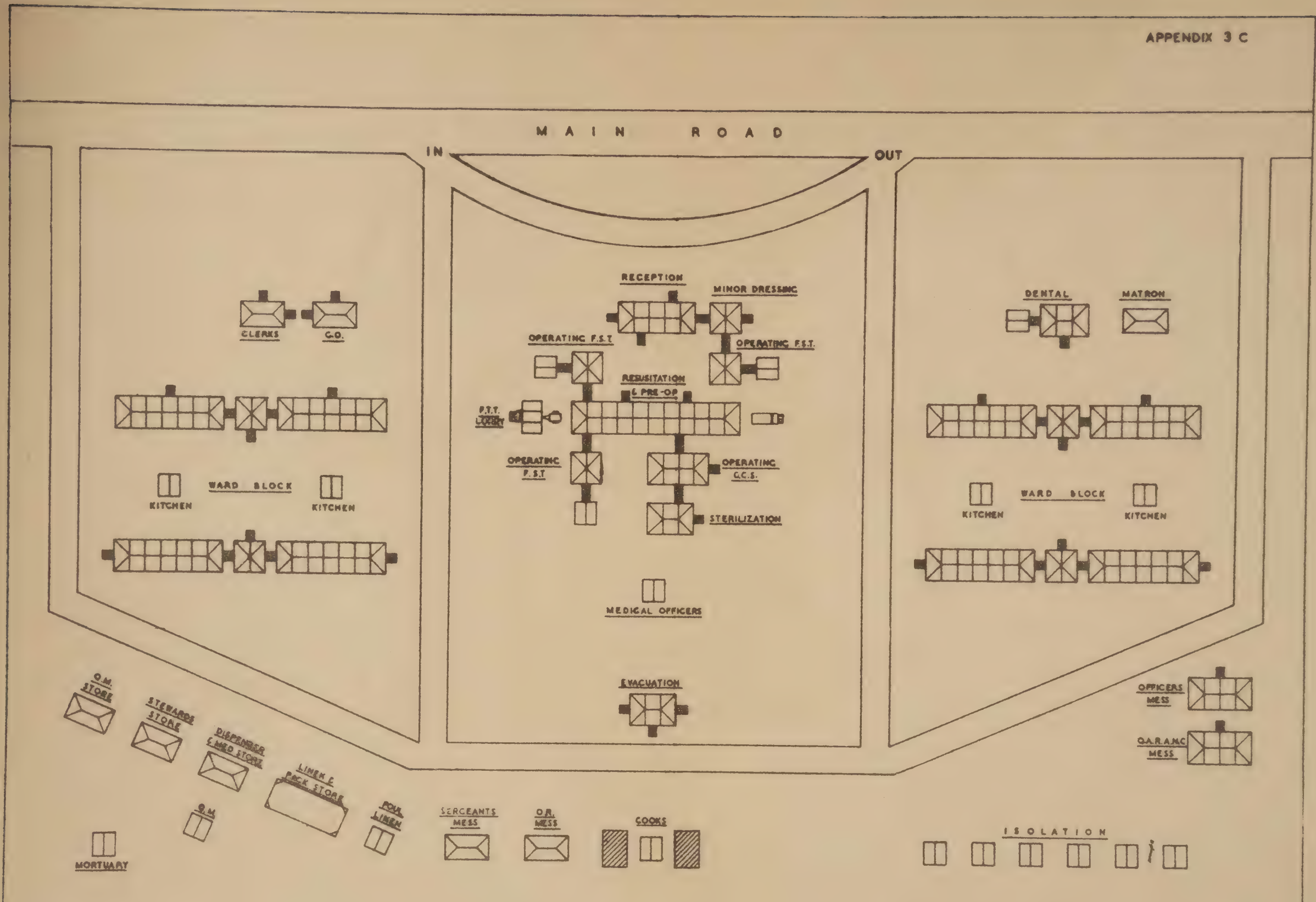




DIAGRAMMATIC LAYOUT OF A
FIELD DRESSING STATION

LEGEND

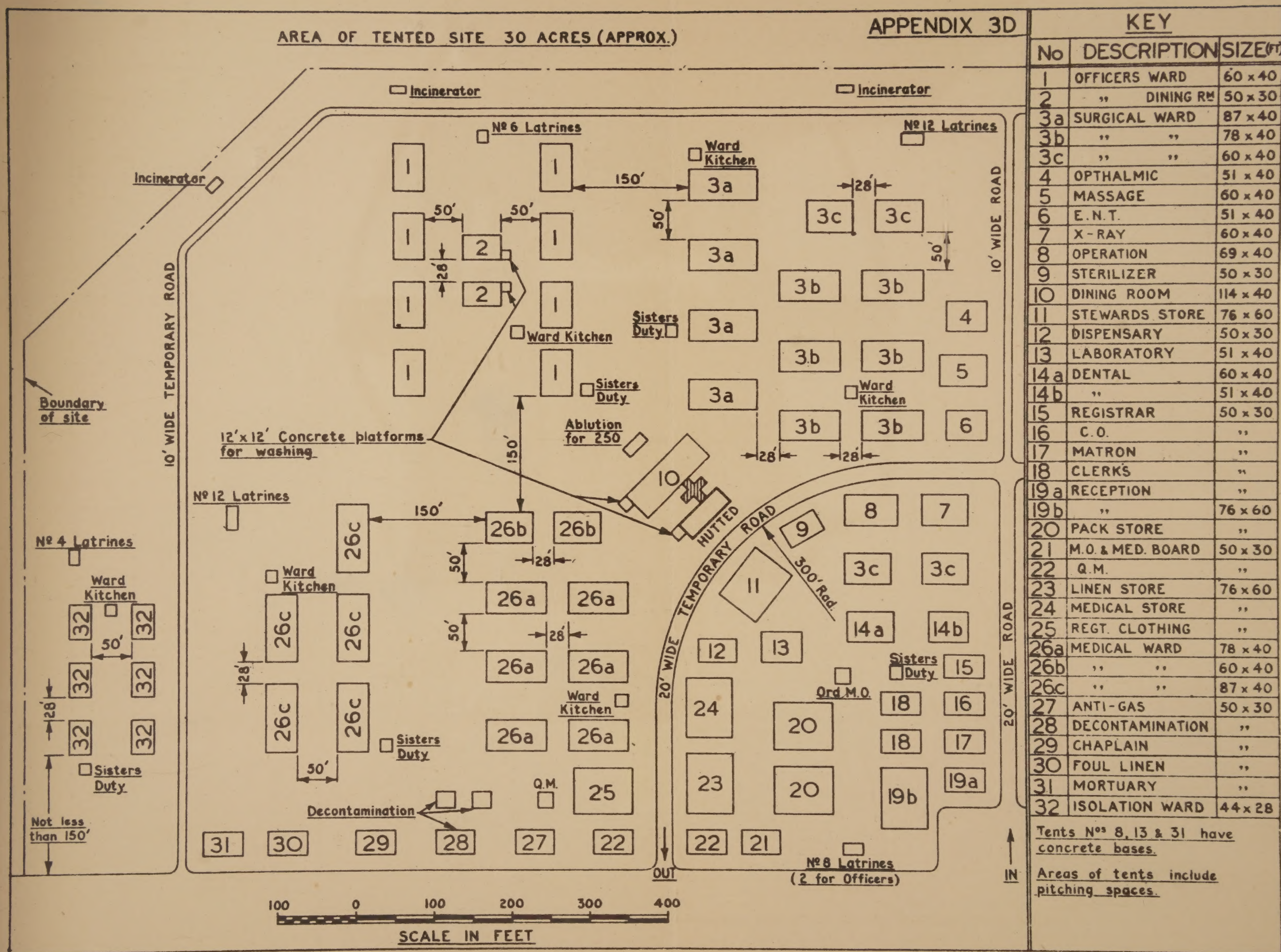




DIAGRAMMATIC LAYOUT OF A CASUALTY CLEARING STATION
120 BEDS 80 STRETCHERS

LEGEND

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| MARQUEE TENT STORE | MARQUEE HOSPITAL EXTENDING | TENT 1601m. | LORRY WITH SHELTER | ROADS |
| MARQUEE C.S. DOUBLE | MARQUEE HOSPITAL EXTENDING (END) | TARPULIN OR EQUIVALENT COVER | TRAILER | PORCHWAY |



DIAGRAMMATIC LAYOUT OF A 600 BED GENERAL HOSPITAL

APPENDIX 4

APPROXIMATE EQUIVALENT TERMINOLOGY IN U.S.
ARMY

Form of ADS pp 29, 31

RESTRICTED